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Including the Proceedings of the
AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

VOLUME XIII FEBRUARY 11, 1924 NUMBER 2

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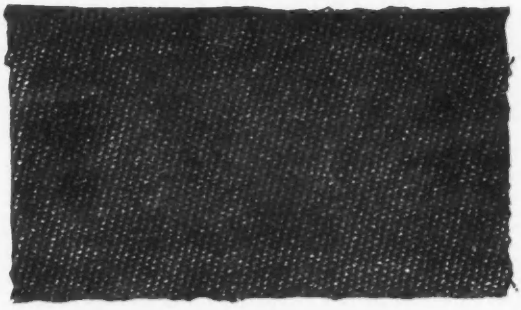

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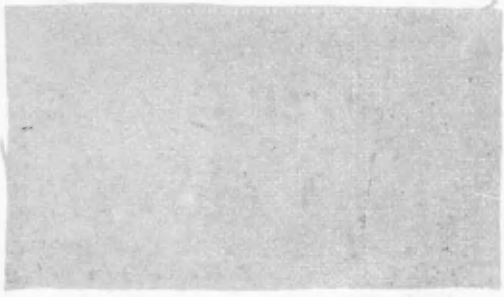

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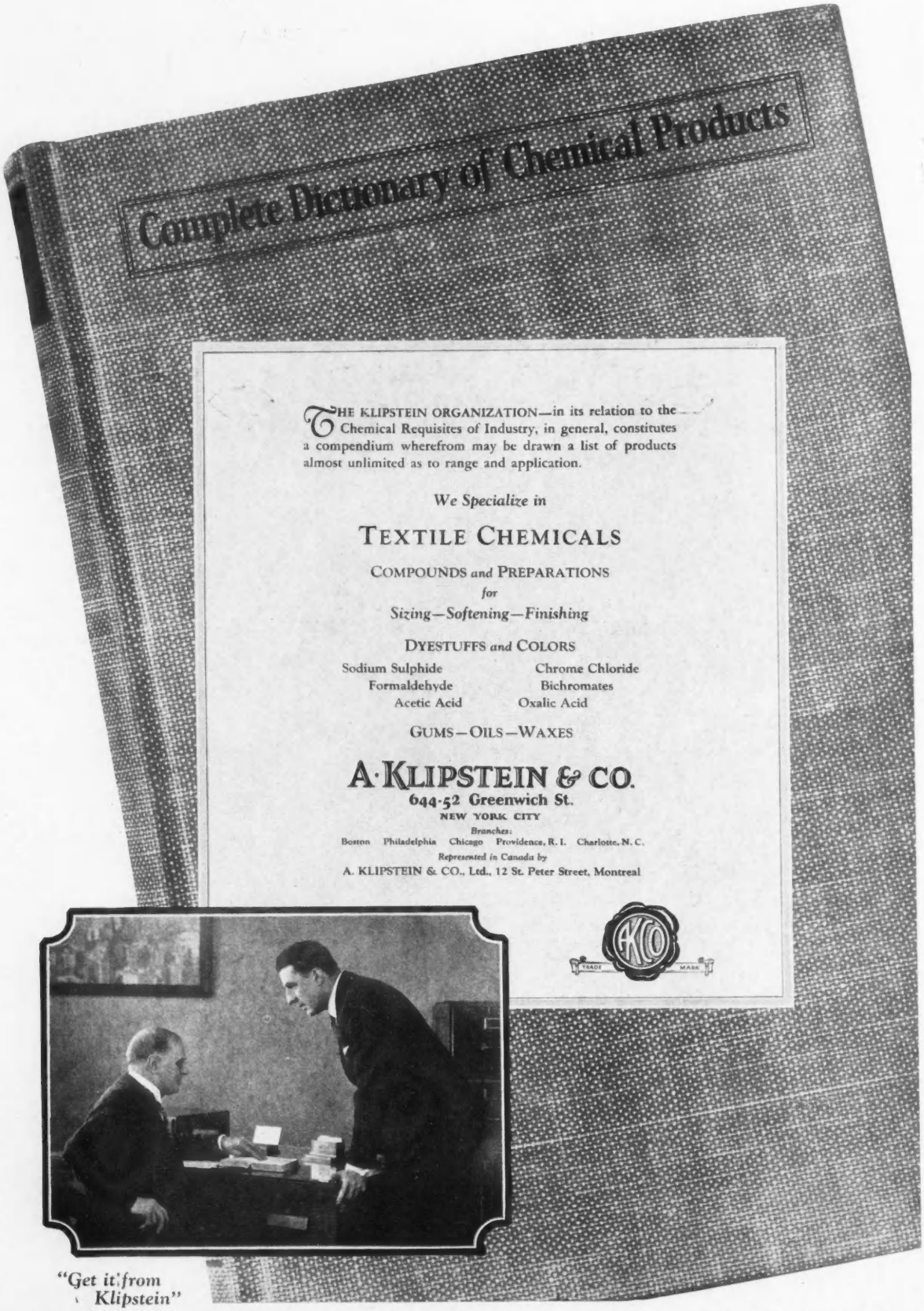
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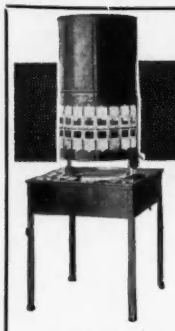

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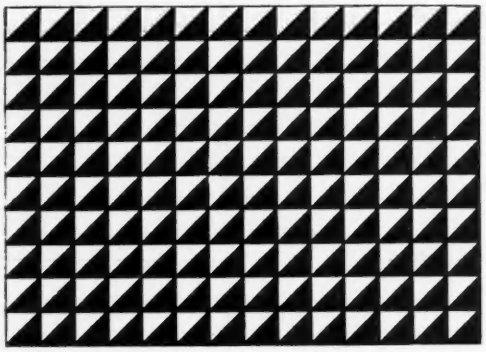

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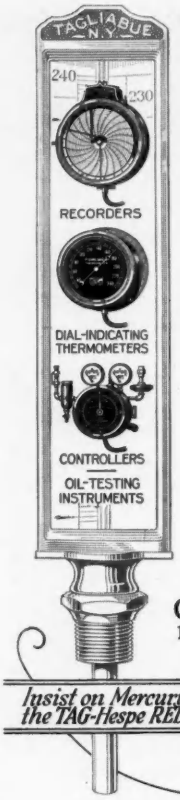

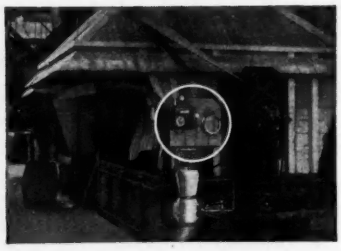

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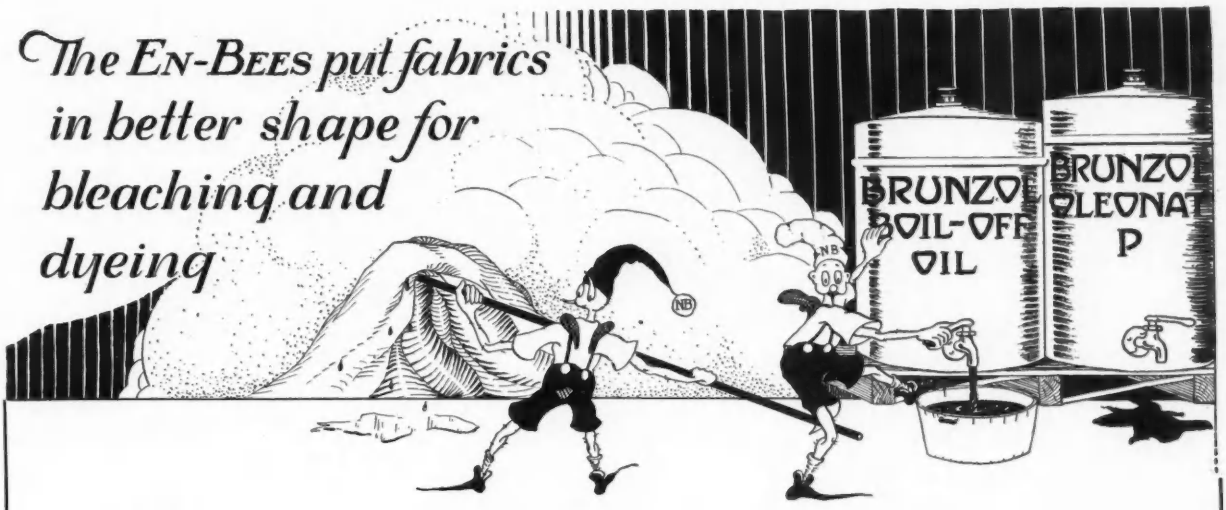

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Contents of This Issue

February 11, 1924

College Men in the Bleachery..... 77
M. W. Ailing

Substantive Action of the Naphthols of the "AS" Series 81
Dr. H. Guertler (Translated by Ismar Ginsberg)

Dress Linens: Their Production and Finish 85
Alfred S. Moore

Proceedings of the American Association of Textile Chemists and Colorists:
December Meeting of the Philadelphia Section 87
Hosiery Dyeing and Its Problems..... 88
Richard C. Spurgeon
Hosiery Dyeing Machines..... 90
Harry S. Drum
Twentieth Council Meeting..... 93
Applicants for Membership..... 94

Editorials:
Woodrow Wilson 97
Reported Anglo-German Dye Agreement. 98
Completing a College Education..... 99

T. C.'s Column:
The Don't-Believes and the Bashful Brothers 99
Technical Notes from Foreign Sources..... 100

Practical Hints on the Production of Bright Colors on Textile Fabrics..... 101
Raffaele Sansone

The Arghan Fiber 107
Max Becke
Steam in Scouring..... 108

More Statistics 108

Recent Patents 109

Trade Items 111

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VOLUME XIII NEW YORK, FEBRUARY 11, 1924 NUMBER 2

College Men in the Bleachery

By M. W. ALLING

Dyer, Waldrich Bleachery, Delawanna, N. J.

The Need for Educated Men—Comparing the Mill Training of the College Man with That of the Practical Workman—How College Men Are Obtained by Mills—A Schedule of Work for Training Students —How Student Workers "Measure Up"—Technical Training Put to Practical Use—Summary

THE spur of competition and the desire for profit is the guiding hand of the principles of organization and operation. In the past, machines, materials and money have played leading parts in our industries, but to-day there is prospect of further progress with men. Men seemed to have been neglected. The time is here when men and their co-operation will count most in our mills. They will be the men who will know how to apply creative and constructive energies by the aid of the training which they have received in our colleges and institutions.

All plants are approaching similar levels of competition in equipment, machinery methods, purchasing skill, promptness in deliveries, etc. It now remains for the varying grades of competitive success to be decided in favor of those mills which renew their organization with men who have had an extensive institutional training, because their power of knowledge will result in the maximum savings through the elimination of waste and establishing efficiency.

Just as the management is interested in making the finished product of the organization the best, it is interested in getting the best that there is in human beings to carry on the work. The young textile school graduates are being more and more experimentally sought after to see how they will find themselves in an industrial environment.

A man's educational groundwork of twenty years ago did not concern his employer as it does at the present day. Education was not recognized in our bleacheries as such a valuable tool as it is to-day, but just as the railroad, the electric car, the automobile and the airplane have superseded the horse-drawn vehicle, so has the modern recongition of the necessity of a better educational groundwork superseded the willingness of the mill owner to place his responsible positions in the hands of men who have not had a technical training. Greater efficiency must be obtained! The bleachery has come to recognize that trained and educated service for this field is required to an extent not dreamed of before.

The lack of efficiency in the past has been partly due to too much guesswork and too little accuracy on the part of our overseers and superintendents who have not had the advantages of a higher education. Losses have been pocketed which were due to the mistakes made by these men who had no other alternative but to gain what knowledge of the business they could by their own initiative. There was no provision made for a much needed special training, except in good, hard, practical work.

There is another reason why education has come to be of the first importance. The war has robbed us of millions of young men who were in the very prime of their lives, and just entering upon the period of production. Nothing but greater efficiency will bridge over this awful gap.

It is by no means as easy or as cheap to obtain unskilled labor as it used to be. The cost of labor is never a stable factor, and it is one of the problems which give the mill owner the most worry. The greater efficiency we need is only waiting for education to produce men who will by their scientific methods lower the cost of production through the better handling of labor, material and machinery.

The following is a typical advertisement showing the call for the college man. It was taken from the help wanted column of one of our largest daily papers:

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Large manufacturing plant has openings for several bright college men between the ages of 22 and 30.

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Comparing the Mill Training of the College Man With That of the Practical Workman

The college man who has specialized in a chemical training is the usual type to be attracted to the work in a bleachery. It is due to the fact that this is one field where the knowledge of chemistry can be put to a wide range of practical use in almost every department, although the laboratory is the only place where the chemist can exercise his chemical knowledge to the fullest extent. Everyone who is so trained cannot become simply a chemist, but he must use his knowledge as a stepping-stone to the work that he is called upon to perform.

The training of the college graduate or the collar-and-tie man is quite different from the training of the man who does the dirty work. The latter, in order to overcome the worries of poverty, and to rise above the ordinary type of labor, has to demonstrate through his daily work that he has special ability, whereas the college man expects to be relieved of these worries, because he has sacrificed his time, paid out a considerable sum of money, and earnestly devoted himself to his studies over a period of a number of years. If the student has successfully completed his college course, he naturally feels that he is a competent judge of his own ability, and that success should, as a natural sequence, be assured him; but the man who has been faithfully plodding along, doing the dirty work, does not have this same amount of self-assurance. He does not realize that he has been able to so train himself in his duties that he has developed marked practical ability, and so it often happens that he is not elected to the higher positions until his superior is so impressed with his worth that he can no longer justly keep him from rising to a higher place. The training of the college man in the mill must, to satisfy a great many of the students, be very rapid, whereas the latter type of men are satisfied with any amount of training, providing they can rise to a higher position. The college man, if he has the right vision and ambition, will not accept the practical training period as a waste of time, although he may be puzzled during this time as to how and where the goal of his ambition will be arrived at. The man who does the dirty work has the advantage of everything to gain and nothing to lose.

Unless the college or collar-and-tie man can be made to realize the necessity of spending a number of years in intensified practical training, the college training will not do for him as much as the school of hard knocks did for the man in poorer circumstances.

How College Men Are Obtained and Placed in the Mill

The general trend of what happens when it has been decided to take on a beginner is for our personnel manager to write to different institutional heads for men who have had the training best fitted for bleachery work. An interview is arranged, more as a matter of form, because the mere fact that he has been recommended by one of such high authority is a guarantee as to his ability as a student. He is made to understand that if he accepts the position, he is to be a potential executive of the company, and that progress and open-mindedness are the keynotes of the organization.

Now that it is recognized, the incorporating of men with technical or college training is of the first importance, the next step is to place the student where he will begin his mill training. It is unimportant where to place him; his first job is to get acquainted with his new surroundings. It is like putting a horse out to pasture. The grass is rather scarce in places, and plentiful in others, but he doesn't pay much attention to this, but goes about his business of eating, and just naturally spends more time where the grass is thickest; and so it is with the beginner; he will not be satisfied to stay at the work which is of the least importance very long.

It often happens that the college man begins his mill training in the dyeing department; in any case he lands there sooner or later as a rule. My first thought is whether he can be made to become vitally interested in my department; enough so, in fact, to be willing to follow out a schedule of work that will fit him to become an assistant dyer. This is not very often easy to do for various reasons which I will mention later.

The student is put to work as a helper on any one of the numerous machines, and after a few days the time is ripe to question him. The questions usually follow in this order: (1) "Have you ever held any other position?" (2) "Do you expect to work in this mill long enough to learn the business?" (3) "Where do your parents live?" (4) "Would you be interested enough to follow out a definite schedule in the dyeing department which will fit you to become an assistant dyer?" The answers to the third and fourth questions are very important, and right there hinges whether I will let him follow out, at once, the regular schedule which I have mapped out for beginners.

It is very often the case, but by no means always, that the young man who takes a position away from his home town and away from the home ties, does not in-

terest himself in his work sufficiently to withstand the discomforts with which he is unfamiliar, and at the first opportunity off he goes to be near his home.

To become an assistant dyer it is very necessary to have a thorough working knowledge of every type of machine and every kind of dyeing process. This is only obtained by actually doing the work, and this, of necessity, takes time. The following schedule covers a period of seventy-five weeks and is all sufficient to familiarize the student with what he has to deal with, so that he can devote any further time to the art of matching shades.

Operation Number	*Operation*	*Number of Weeks*
1.	Helper on two kinds of padding machines	4
2.	Operating two kinds of padding machines	12
3.	Helper in the drug room	2
4.	Helper on the sulphur dyeing machines	1
5.	Operating the sulphur dyeing machine	2
6.	Helper on the para red machine	1
7.	Operating the para red machine	2
8.	Operating the beta-naphthol prepare machine	1
9.	Mixing dye solutions for all padding machines	4
10.	Time study of pads	6
11.	Jig helper	4
12.	Jig operator	6
13.	Routing cloth to the jigs	4
14.	Office training for dyeing department	26
	Total	75

The training of potential executives should be guided by a definite policy. How could a school of any kind be run without a regular course of study mapped out for it? Or what would happen if all of the pupils should raise their hands, one at a time, and suggest to the teacher what line of study they wished to have taught them? It couldn't be done! The following of a positive schedule accomplishes a twofold result. First and foremost, from the company's standpoint, the potential executive has, at the end of this training, become a valuable employee; he has gone through the most trying and uncertain part of his career, and he can be relied upon to perform any duties which he may be called upon to do. The second result is that the student has firmly established himself in the mill and has received a training which will be parallel to his institutional training, and of great service to him in whatever capacity he is called upon to fill in the bleachery.

How Student Workers "Measure Up"

In spite of the fact that our common laborers take the last place in the performance of the duties in the mill, they do set a standard which, if lived up to, requires faithful service, patience, endurance, long working hours, dependability, obedience, and a willingness to meet any emergency that may arise in order to carry on the production to a finish.

The first important step, therefore, for the student worker is to throw himself, body and soul, into his work, so that he becomes master of his job, and successfully competes with the common laborer and is in a position to replace him, not alone in operating a machine or similar duty, but a much harder one, that of meeting the seven unseen requirements mentioned above.

Among some of the students who have come to my attention in the mill is a type which has more or less radical views. This type seem to have drawn the conclusion that after spending so much of their time in obtaining a special education and sacrificing the amount of money which they might have earned if they had worked, that the world owes them a living and they are going to collect it. They want to make a living the easiest way and they have little respect for work which can be done by the common laborer and even less for this sort of work if it involves more of their time than an eight-hour working day.

In one of the departments of the mill the common laborers were replaced with young men fresh from special training schools. They learned to run the machines quickly and did their work intelligently, but just at that time a rush of orders came in, making it necessary to work overtime, and they showed their hands pretty quickly. They utterly lacked the spirit of the common laborers; this spirit was foreign to them. There was no time to train them in these unseen qualities. It was pitiful to think that their special education had not included at least an inkling of what would be expected of them when they got out into the mill. There was nothing left to do but to be very exacting and demand a cultivation of this spirit. There were a great many abilis; one man couldn't understand why he should work overtime or Saturday, because he was working on a salary; another wanted to be changed at once to a different kind of machine so that he could learn the business as fast as possible; another deemed it necessary to go to work in another department, because he was adding one more to the discontented in the department.

The result was that one gave up his position, another drifted aimlessly about from one machine to another, copying formulas, but neither took time to gain the goodwill of the department heads in the departments where he was working, or to gain any great knowledge of what he was doing; and still another who had the proper workingman's spirit, suppassed the common laborer in the performance of his duties and is to-day on the road to steady advancement.

Spirit is something that means dollars and cents and a sound organization. Who wants to work for a company that isn't sound? And how can a college graduate expect to receive what is due him if he is not willing to give service which is more valuable than that given by men who have had less advantages than he? A sound

company is in a much better position to give credit to its workers than one which just manages to skim by.

The student worker who proves to be quiet and industrious, never doubting his wisdom in sticking to a work which has a network of unending problems which unravel themselves to him, the longer he stays at it, is the one who knows that the outcome will be an accumulated wealth of knowledge with no short cuts to hamper his future progress.

There are really only two distinct types of student workers. The one is perfectly willing to trust himself to the care of his overseer, and the other takes that responsibility upon himself. The former gains the advantage of having the confidence of his overseer, and through his teachings he gets first-hand knowledge of the business. The latter type, by suggestion, worms his way in and out from one machine to another, which is a very difficult thing for him to engineer, because he never knows, in seeking his own ends, just how his changing about is going to please the men with whom he has been directly associated with, or whether his management has his interest in their minds enough to approve of the steps he takes to learn the business. If his system works out all right, he quickly gains a smattering of knowledge of the whole mill, and possibly he can pick and choose the position which he has found to be the most interesting or lucrative.

Technical Training Put to Practical Use

I know of no class of work more complicated, as a whole, than is to be found in the bleachery. It is a business within a business, a mill within a mill. There are as usual call departments, but they are more than departments. They have all the earmarks of a complete business in themselves. They deliver a finished product from one department to another, which calls for the highest grade of technical ability, engineering skill, and foremanship in general. These so-called departments are run by skilled men who have made the subject their life study from a practical standpoint. In the past only a small proportion of these men received a special education to fit them for their work.

The larger mills employ an expert chemist whose duty it is to act as the memory of the mill. He keeps a careful record of all the difficulties encountered from year to year. These difficulties travel in circles and he has to be ever watchful of the work that is being carried on in order to check the unconscious mistakes made by the men in charge. These mistakes are due mainly to the highly technical composition of their make-up and to the infrequency with which they occur. Of course, the more men there are in the bleachery who are equipped with a special educational training, the higher will be the general memory of that mill, and it will not be so dependent upon one man to keep it in order.

The student worker must learn to link theory and practice strongly together. No matter how simple the problem may be, it is well for him to at once associate theory with the practical work which he is doing. To my mind this is the secret of success. It is the easy balancing of theory with the practical.

To illustrate this point: Suppose a dyeing was to be made with a vat dye on cotton piece goods, and the scum formed by oxidation on the dye liquor adhered to the cloth and spotted it, what steps should be taken to prevent these spots? To the student who could visualize his studies, a solution would present itself at once. The reason for the scum forming there must be due to capillary attraction; the cohesion within the liquid is stronger than the adhesion between the scum and liquid. A needle can be floated on water because the resulting strain shows itself as capillary depression. This cohesion can be made weaker by an addition of any substance which will wet it out, such as a mixture of soluble oil and pine oil, because the adhesion between the scum and liquid will be stronger and the strain will be capillary ascension instead of depression, and the scum will sink as fast as it is formed. He tries the theory out and it works!

Summary

Summarizing, I would recommend:

1. That mill owners take the wonderful opportunity to train up a force of technical men, which can be done in a period of two or three years, from which a supply of competent heads of departments in the mill could be drawn.

2. That colleges and institutions of all kinds incorporate in their teachings the unseen standards set by the common laborer, so that the student worker will not find himself in an embarrassing position when he is called upon to meet them.

3. That mill owners establish a positive schedule of training for the student worker in each department, covering a period as near as possible of a definite length of time.

4. That the mill chemist be not only a chemist, but a teacher as well for the entire mill, holding class meetings or issuing bulletins regularly concerning the work which will add materially to the knowledge of everyone.

5. That the man with a special education be made to realize that this intensified practical training must, of necessity, cover a period of a number of years before he can be successfully established in his business career.

Barium Reduction Corporation has leased its chlorine plant at South Charleston, W. Va., to the Carbide & Carbon Chemical Corporation, a subsidiary of the Union Carbide & Carbon Company, New York. The chlorine plant has been closed for a number of years and will be reopened by the Carbide company for the manufacture of chlorine products. The lease does not affect the barium products plant of the Barium Reduction Corporation.

Substantive Action of the Naphthols of the "AS" Series

Mechanically Adherent Naphthol—Determination of the Naphthol Content of the Solutions—Absorptive Capacity and Colloidal Condition—Substantive Action and Temperature of the Bottoming—Duration of the Bottoming—Alkali Used—Effect of the Addition of Protective Colloids—The Addition of Electrolytes—Determining the Substantive Action—Comparison of Naphthols—Discussion of Results

By DR. H. GUERTLER

(Contribution from the Dye Laboratories of the Griesheim Works)

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Translated by Ismar Ginsberg, B.Sc., Chem. Eng.

IN the process of bottoming Griesheim red, more naphthol is drawn from the dye bath than what corresponds to the quantity of liquid held in mechanical combination. It is possible completely to exhaust a bottoming bath in a series of tests. Hence, when the dyeing operation is carried out in a continuous manner, for the purpose of bottoming it is necessary to add solutions of materials, the concentration of which is considerably greater than that of the original solution.

The effect of the addition of the auxiliary reagent is, first, to substitute that part of the naphthol that remains adherent to the yarn by mechanical attraction, and, second, the quantity of the naphthol that is combined with the fiber in the manner of a mordant.

Mechanically Adherent Naphthol

The quantity of naphthol that is mechanically adherent to the textile fiber is constant so long as the concentration of the bath remains constant. On the other hand, the substantive action of the different naphthols varies rather considerably. That this would be the condition is to be expected, as in the case of the different naphthols the concentration of the auxiliary solution used in the dyeing process (a determination of which is made from purely empirical data) varies considerably, although the concentration of the bottoming bath remains constant.

The coefficient of substantivity is fixed for the degree of the bottoming. The stronger substantive properties a naphthol possesses the weaker the concentration of the bottoming solution can be and still make it possible to obtain deeply dyed shades on fabrics.

Determination of the Naphthol Content of the Solutions

The titration of the naphthol solutions before and after dyeing for the purpose of determining the percentage of naphthol contained therein cannot be performed, for the simple reason that there has been no analytical method devised for this purpose which is free from objections. Thus, for example, the reaction resulting in the combination of the naphthol with a normal diazo solution is incomplete; then, again, even if the reaction were complete it would be difficult to recognize the end point. Diazotized para-aminoacetanilide gives the best results; on the other hand, absolutely accurate results cannot be vouched for by this method.

For this reason, the naphthol content of the residues from different dye baths, prepared in a series of increasing concentrations, was determined by a colorimetric method. The strength of the dye baths bore a definite relation to the concentration of the solution. However, this method is suitable only for those bottoming baths which are of low concentration, as in practical work it is impossible to tell the difference between the results obtained by dyeing with a bath containing 10.5 grams of naphthol to the liter of solution and those obtained by using a liquor which contains approximately 10.2 grams of naphthol per liter of solution. Differences are first noticed in the lighter color of the dyed fabrics. For this reason the dye liquors which are employed in the series of experiments, which will be explained in the following, start with a concentration of 3 grams of naphthol per liter.

Absorptive Capacity and Colloidal Condition

The absorptive capacity of the naphthols is dependent on the colloidal character of the solutions. We are concerned here with an absorption of the colloidal particles of the substance by the textile fiber. This absorption phenomenon is dependent on the size of these particles; that is, the degree of the dispersion.

The absorptive capacity, and hence the substantive action, of the naphthols is primarily dependent on the temperature. The higher the temperature the less the

absorption of the naphthol and the weaker the shade of the dyed fabric. Practical experiments have proven the truth of this conclusion.

Substantive Action of the Naphthols and the Temperature of the Bottoming

When the bottoming process is carried out at a temperature of 80 deg. Cent., then the intensity of the color that is produced in this manner is reduced to about half of what it is under normal conditions, and the substantive action becomes a minimum with all the different naphthols that are used for this purpose. When Naphthol AS-SW is employed, the color produced by bottoming at a temperature of 80 def. Cent. with 3 grams of naphthol per liter corresponds to the color that is gained by carrying out the bottoming process at a temperature of 20 deg. Cent. with 1.2 grams of naphthol per liter.

The naphthols exhibit the greatest substantive action when the dyeing process is carried out between the temperatures of 15 and 20 deg. Cent. When the bottoming process is carried out at a temperature below these, then the substantive action of the naphthols is reduced, as well as the depth of the color that is obtained on the fabric. This is due to the fact that under these conditions a partial separation of the naphthol takes place.

The substantive action of the naphthols is naturally dependent on the composition of the dye liquor and the manner in which the dye bath is constructed. It is very instructive to know that when the process is carried out in a long dye bath, and when the dye liquor used is the same as that which is employed in a short dye bath, more naphthol is absorbed by the bottomed goods in the first case than in the second. It is therefore essential to see that the dimensions of the dye bath are as one to twenty, especially when carrying out the dyeing process with the aid of Naphthol AS-SW.

The third factor that affects the substantive action of the naphthols is the duration of the bottoming process. It is obvious that a skein of yarn which has previously been subjected to a bottoming process lasting just one minute is colored in lighter shades than when the bottoming process lasts ten minutes. In the case where Naphthol AS-SW is employed in the dyeing process, the absorption process lasts for a period of from twenty to thirty minutes, and a skein of yarn which has been subjected to a bottoming process in a bath containing 3 grams of naphthol per liter for the period of one minute gives a dyeing of only 1.8 grams. The dyeings which were carried out, as will be described, were all made on goods which had first been subjected to a bottoming process lasting for thirty minutes. The conclusions which are drawn from this series of experiments in reference to the composition and construction of the dye bath apply only to bottoming in vats.

Alkali Used and the Substantive Action of the Naphthols

The quantity of alkali that is employed in bringing about the solution of the naphthol has no effect on the substantive powers of the substance. In the same manner the addition of formaldehyde to the bottoming bath has no effect on the substantive action. On the other hand, the substantive power of the naphthols is affected to some extent by the quantity of Turkey Red Oil that is employed in the general dyeing process. The more oil that is used to prepare the bottoming bath the less the substantive action of the naphthols. This phenomenon may be easily explained by the aid of colloidal chemistry. It is known that an oil increases the degree of dispersibility of a colloidal substance; hence the particles of the same become smaller, resulting in the substantive action becoming less, as in this case the coarsely dispersed solution is converted into a finely dispersed colloidal solution.

The addition of other protective colloids, such as gelatine, glue, etc., to the bottoming bath, which has the effect of preventing the rapid gelatinization of the individual naphthols, has a slight deterrent effect on the activity of the naphthols in their substantive action in the dyeing process. The effect is much the same as that produced by the Turkey Red Oil.

If the degree of dispersibility of the naphthols is altered by the addition of another solvent, then this would naturally produce quite an effect on the substantive powers of the naphthols. If a napthol is dissolved in a mixture which contains equal parts of water and denatured alcohol, then the substantive action of the naphthol is nil. The later effects are stronger than the earlier. The reason for this phenomenon is to be looked for in the dilution of the solvent. It is to be remarked at the same time that the dyeings obtained when using a 50 per cent alcoholic solution of the dyestuff possess less than one-tenth of their normal strength or intensity. For example, a dyeing carried out with the aid of a bottoming with Naphthol AS-SW, in which the concentration is 3 grams per liter, possesses only the intensity of a dyeing carried out on a normally bottomed sample in a concentration of 0.2 gram per liter.

Effect of the Addition of Electrolytes

The addition of electrolytes to the bottoming bath occasions an increase in the size of the particles of the solid which is dissolved in the solution. The result is consequently an increase in the substantive action of the naphthol. Common salt exerts the most powerful action in this respect. Then follow Glauber salt (sodium sulphate) and sodium acetate. The action of the common salt, sodium chloride, is three times as strong as that of the acetate. If too strong an electrolyte is added to the bottoming bath, the size of the particles of the naphthol is increased to such an extent that pre-

cipitation of the latter takes place. The naphthol in precipitated form does not possess any longer the power of being absorbed by the fiber. Because of the fact that sodium chloride possesses a very strong precipitating action on the solution of the naphthol, considerable care must be taken when this salt is added to the bottoming bath so that the naphthol in it is used completely and to the best possible advantage.

Determining the Substantive Action of Naphthols

The author carried out a certain number of experiments to determine the substantive capacity of some of the naphthols. Dry cotton yarn was placed in a bath containing 3 grams of naphthol per liter of solution. The weight of the cotton yarn was 50 grams, and it was permitted to remain in the bottom bath at a temperature of 20 deg. Cent. for a period of thirty minutes. Then the yarn was well squeezed between rollers or by hand to remove all excess bottoming solution. The bottomed yarn was then dyed with Fast Red Salt GL.

The volume of the bottoming that remained after this experiment was 900 c.c. This solution was used again for a bottoming treatment of cotton yarn, the operation being likewise carried out in a vessel the dimensions of width to length of which were as one to twenty. This time about 40 grams of the cotton yarn were employed and were allowed to remain in the bath at a temperature of 20 deg. Cent. over a period of thirty minutes. The excess bottoming solution was then thoroughly squeezed out of the yarn and the skein dyed again with Fast Red Salt GL.

After this experiment there remained about 800 c.c. of the bottoming solution, and this solution was used again in the same sized processing vessel to treat cotton yarn. The weight of the skein of cotton yarn that was employed in this, the third, experiment was 40 grams. The same procedure was repeated and the residual bottoming solution was employed to treat 35 grams of cotton yarn. The residual solution had a volume of 800 c.c. The operations were then continued in the same manner as described above.

Comparison of Different Naphthols

When these experiments were carried out with all the naphthols of the AS series, the results showed in a very clear and conclusive manner than when any of the naphthols were employed to give the cotton yarn a bottoming treatment prior to the dyeing operation, the color of the dyed skeins became considerably brighter. The strongest action from this standpoint was possessed by the naphthol known by the designation Naphthol AS-SW; then there followed in order Naphthol AS-BO, Naphthol AS-BS, Naphthol AS-RL and, finally, Naphthol AS.

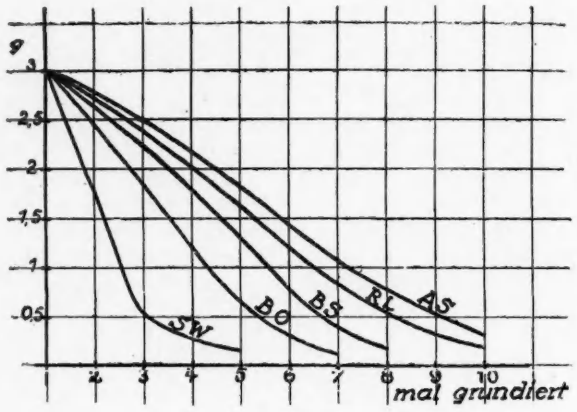
It is therefore clear that all the naphthols possess some degree of substantive action and that this degree varies with the individual naphthol. Naphthol AS-SW is the strongest of all the naphthols in this respect and Naphthol AS is the weakest. The difference in the substantivity of the individual naphthols is explained by the difference in the size of the particles of the same. The larger the particles of the naphthol in solution the greater the substantive action of the naphthol, which also means that the tendency of the naphthol being thrown out of solution by the addition of electrolytes is so much the greater.

Strength of the Substantive Action of the Naphthols

In order to determine the strength of the substantive action of the naphthols, a series of comparative dyeings were prepared for each of the naphthols, these dyeings being arranged in a series in which one sample differed from the next lower and that higher by a tenth of a gram in the strength of the naphthol solution. By means of this scale it is easy to determine the strength of the naphthol solution through the intensity of the color that is produced by its aid. The following comparative figures were obtained for the various naphthols:

Bottoming No.	AS	BS	BO	RL	SW	
1.....	3.00	3.00	3.00	3.00	3.00	Original naphthol content of solution.
2.....	2.75	2.60	2.40	2.70	1.70	
3.....	2.50	2.20	1.80	2.40	0.50	
4.....	2.20	1.80	1.20	2.00	0.20	
5.....	1.80	1.30	0.60	1.60	0.10	Naphthol still
6.....	1.40	0.80	0.25	1.20	..	present in the so-
7.....	1.10	0.35	0.05	0.80	..	lutions.
8.....	0.80	0.20	..	0.50	..	
9.....	0.60	..	..	0.30	..	
10.....	0.30	..	..	0.15	..	

The curve chart shows the substantive action of the naphthols in the form of curves. The number of the bottoming operations which were carried out one after the other are shown on the abscissa scale. On the other hand, the ordinate scale gives the amount of naphthol still present in the bottoming bath at the time that the last bottoming operation was carried out. After the bottoming process was repeated three times without any addition of naphthol to the bath containing Naphthol AS-SW, originally of a concentration of 3 grams of naphthol per liter, the bottoming bath is seen from the chart to contain only 0.2 gram of naphthol per liter. On the other hand, when the bottoming process is carried out with the aid of Naphthol AS-RL, the proportion of naphthol in the bottoming bath was 1.9 grams per liter.



It is also evident from the figures given above, as well as from the chart, that the reduction in the concentration of the bottoming bath is quite regular for the various naphthols that were investigated. In general, the greater part of the curve is a straight line, but at the lower end the curves flatten out.

Addition of Naphthols Required

On the assumption that the course of the curves is that of a straight line at higher concentrations as well or approximately so, it is possible to calculate the following quantities of naphthols that must be used in the bottoming baths. This calculation is carried from the experimental results that have just been obtained. For a 10-gram Naphthol AS dyeing it is necessary to use 15.7 grams of naphthol per liter; for a 10-gram Naphthol AS-BS dyeing it is necessary to use 17.6 grams of naphthol per liter; for a 7-gram AS-BO dyeing it is necessary to use 18.5 grams of naphthol per liter; for a 4-gram AS-RL dyeing it is necessary to use 9.7 grams of naphthol per liter; for a 5-gram AS-SW dyeing it is necessary to use 27.7 grams of naphthol per liter. All these figures are based on 1 kilogram weight of goods treated.

Discussion of Results

It was found that the values given above were all somewhat higher than those used in practical work, having been determined through purely empirical reasoning. Hence, it must be assumed that the curves are not exactly straight lines, but are slightly curved at the ends, particularly in the region pertaining to high concentrations of the naphthols.

The fact that Naphthol AS and AS-BS, whose substantivity curves lie so far apart, can easily be mixed together without any preliminary treatment or special precautions being necessary appears remarkable. It is also noteworthy that the dyeing of fabrics may be carried out with this mixture in a continuous dye bath without any defects in the dyed materials.

An experiment which was instituted in order to determine this condition yielded a curve which first seemed to approach the Naphthol AS-BS curve quite closely, but which, after the fourth bottoming (just before the fifth was carried out), appeared to lean more toward the Naphthol AS curve. The color of the dyed fabric naturally lost some of its blue tone as a result.

As the melting point of a substance is decreased by the admixture of another, and as the same gradually increases as the impurity is gradually removed until, as soon as the substance is purified, it reaches the original melting point, it can be seen that Naphthol AS, when mixed with Naphthol AS-BS, exhibits a strong degree of substantive action which, so long as a high percentage of Naphthol AS-BS is present, varies considerably from the normal. As, however, Naphthol AS-BS is from its nature the stronger in adsorptive power, the bottoming bath, after the bottoming process has been carried out, always contains more of the naphthol that is not so greatly adsorbed. The result is that the Naphthol AS-BS is no longer able to exert its potent effect on the substantive power of the mixture as it did at the outset.

Because of this it is necessary, in carrying out the dyeing process in a continuous bath, to fix the ratio of Naphthol AS to Naphthol AS-BS in favor of the Naphthol AS-BS. In the experiments which have been carried out in practice, nevertheless, no yellowing of the color was observed, even in the dyeings that were done at the end of the process. In all cases it is evident that errors in the dyeings are considerably reduced by the addition of naphthol each time that the dyeing process is carried out.

Although the process which has been described herein for the determination of the substantive capacity of the different naphthols of the AS series may possess certain inaccuracies and disadvantages, nevertheless it shows very clearly indeed how the different naphthols behave in comparison with one another. It affords the dyer some idea of how much of the naphthol he must add to the bottoming bath in order to secure certain results in the dyeing of the goods. The results that have been given in the tables listed above enable him to determine the correct concentration of his bottoming bath when using the different naphthols of the AS series to give good results in dyeing practice without the necessity of going to the trouble of making a preliminary dyeing test.

Kier boiling is dispensed with in the Mohr cotton bleaching process which is attracting attention in German textile circles. Sodium peroxide is used, it is said, with better effect than hypochlorites.

Khaki dyeing by a new process is published by "Ciba" in the Mulhouse Bulletin, one feature of which is the new use of sodium beta-naphtholate as a mordant.

Dress Linens: Their Production and Finish

Popularity—Former Difficulties in Dyeing—Foreign Linen—Shades—Yarns—Qualities of Linen—Dyeing Processes—Finishing—Shrinking—Irish Method

By ALFRED S. MOORE

IT may be that those connected with the linen industry were super-optimistic in their anticipations of a great revival in the demands for all classes of linen goods during the period succeeding the war, but the fact remains that with the exception of the post-boom year of 1920, which was an extraordinary period, linen buying in general is far from approaching the level maintained during the ante-war period.

It will be alleged that linen is still too expensive, and roughly it stands about two and one-quarter times higher than in 1913; but, on the other hand, cotton has similarly advanced about two and one-half times, and when one compares the durability and other superior qualities of linen it is undoubtedly the cheaper fabric. Moreover, the revival in cotton goods buying is just as long delayed as in the case of linen. It may be that a section of buyers think linen may come cheaper, but it is safe to conclude these expectations will not be realized in the near future.

Dress Linens Very Popular

Nevertheless, while linen buying in general is dull there is one class of goods which is enjoying almost a boom. For months back we have read in market reports some such phrase as "the heavy demand for dress linens continues to be the most interesting feature of the market." Tans, grays and browns are the most popular colors according to one of the largest importers of these goods. White and oyster shades are also in heavy demand.

It is undeniable that dress linens are the vogue of the moment, and that they are so is a credit to the enterprise of the linen dyers and finishers in surmounting the many difficulties which confronted them.

Former Difficulties Overcome

For years the great drawback in linen for ladies' dresses was that it creased so easily and ever betrayed that crease; but now almost all fabrics for that purpose are uncrushable. Then, another great trouble for dyers was to treat the flaxen yarns so as to give colors with a sufficient degree of fastness, and simultaneously to produce a fiber which had not undergone any deterioration during the process of dyeing. Linen yarns are very susceptible to damage if not handled very carefully during the dyeing operations.

Formerly costume or dress linens were made from dyed yarns, but nowadays they are mostly manufactured from half-bleached yarns and then piece-dyed. It is often alleged that yarn-dyed fabrics are more durable and satisfactory, finish up better and present a more pleasing appearance. However, these statements are not altogether borne out by present-day experiences.

Where France Scores

It is something, too, that with commendable perseverance British linen dyers and finishers have so much improved their methods recently that now their products can well compare with the finesse formerly peculiar to the French. Undoubtedly we owe much to our Gallic contemporaries for improvements in manufacturing, also in dyeing and finishing. Indeed, it is still maintained that one particular quality, made from a linen yarn, has never been equaled by either Belgian or British makers. The French fabric is generally soft, clothy and comparatively dull, while the Irish fabric is comparatively bright and hard. In fact, until a few years ago one might assert that the Irish dress linen in comparison with the French lacked "life" and that clothy feel so much desired by the garment makers. However, it must be conceded that the Irish producers have made great strides toward these ideals, although they admit that there is yet much to be done.

As regards markets for these costume linens, while the United States supplies the chief demand, they are also very popular in wealthy South American cities, while our colonies are also taking large lots now. Indeed, while the cloth is exported largely to New York, to be there used in the ready-made clothing trade, several Belfast concerns have also enterprised in this branch for home and colonial orders.

A Legion of Shades

As for variety shades, some manufacturers are able to list as many as a score, and very beautifully attractive some of these tints are.

The yarn is invariably bleached before weaving when the cloth is intended to be dyed in the piece. A full white is not sought for, since the bleaching would weaken the fiber and produce difficulties in weaving; it would also reduce the weight, which in this case is a very important consideration. As a matter of fact, what the bleacher has chiefly to aim at is to eliminate as little as possible of the impurities, while simultaneously producing a white that satisfies the dyer's requirements. Without very prolonged and watchful experience this is not easily achieved.

Uniform Yarns Essential

Further, the bulk of the yarns must be of uniform color, for variations in their tone would mean endless trouble to the dyer. Of course, when I stated that little attention would be given to the elimination of impurities from the yarn I did not suggest that the "sprit" should not be removed. These sprecks of woody matter, or "sprits," are not covered by the dyestuffs, and so would show up as blotchers. There are naturally many qualities of dress linens made, but for convenience manufacturers and merchants usually group them under three headings:

1. Fabrics made from line yarn.
2. Fabrics made from wet-spun tow yarn.
3. Fabrics made from dry-spun tow yarn.

Dress Linen Varieties

All these materials are sold in natural colors as well as in bleached and dyed. In dyed dress linens there is not quite the same variety of make as in bleached and dyed cloths, for most dyed linens are fairly coarse in texture and heavy in weight. For the export markets a great variety of suitings and dress linen goods are made in the natural cream or tussore shades. Similarly, for the same markets common brown holland is a prime feature.

This last-mentioned style of fabric is exceptionally suitable in color and coolness for wear in hot climates, especially where dust is also prevalent.

How They Excel

The good-wearing qualities of linen in general are well known, and the various dress linens are superior because of this feature. In fact, as a dress material there can be no real comparison between linen and cotton fabrics, and the greatest and most striking feature difference is due to the length of their respective basic fibers. In flax, the length of the fiber is many times that of the longest cotton fiber—even though flax has to be split and broken in the processes of manufacturing it into yarn; whereas cotton is handled in its original state. Again, flax is a much harder, stronger and denser fiber, so when spun it makes a much more compact thread than cotton. It is entirely free, too, from that hairiness which makes it necessary to have most cotton fabrics singed in the course of their finishing processes.

With all these salient characteristics considered, it follows that, when woven into cloth, linen fabrics are of greater strength and of stiffer nature than cotton, and herein lie the virtues for many of the uses to which linen can be put.

They Improve by Laundering

Another important qualification for linens for costume uses, apart from their ever-grateful cool, clean and refreshing nature, is that they wash easily and, with careful laundering, preserve their appearance for an indefinite period.

As a dress material linen is more essential to those whose lot is cast in tropical or semi-tropical climates than to dwellers in the temperate countries of the globe. Nevertheless, there is no reason why linen should not be as fashionable for masculine garb in the United Kingdom and in the Colonies as it is for ladies' costumes. In the sixties of last century linen was generally worn in the form of summer suitings, just as freely as flannel is now worn. A return to that practice is not altogether unlikely. It is true that silk and linen are rivals for men's tropical suitings in the high-class trade, but there is always a demand for the flaxen fabrics. The suits are delightful to wear because of their coolness; then, they wash easily and, if properly shrunk before making up, they keep their shape most satisfactorily.

Linen-Dyeing Processes

In dyeing linens for costume purposes direct colors are generally used. Recently, successful results have been obtained with vat colors so far as regards shade and evenness, but the penetration leaves much to be desired, especially with members of the anthracene series. This is unfortunate in some cases, as they possess exceptional fastness to light and washing. Moreover, the cost of dyeing is considerably increased; and as this is a very important item, it is scarcely probable that these colors will be used in any quantities until the makers are able to place them upon the market in cheaper form.

It may be remarked here that the linen dyer has no such library of advice as the cotton dyer is equipped with, and he must rely very much on his own individuality and experiences. The dyeing of dress linens is beset with difficulties. One highly important matter is penetration, and only pressure can be relied on to give this. Some colors penetrate much better than others. And a badly penetrated piece when cut or rubbed exhibits a very unsightly appearance. The addition of small amounts of Turkey red oil, a few more ends in the boiling dye bath, and excessive tension on the winding-off roller are sometimes used with effect.

Care in Dyeing Vital

Moreover, if the cloth is lightly woven a serious decrease in width may take place during the dyeing and this is most undesirable. In a few instances penetration has been much improved by giving the dyed cloth three or four ends in boiling water subsequent to the dyeing proccess, though this proceeding causes an alteration in shade ess, though this proceeding causes an alteration in shade and also diminishes the intensity of the color. In fact, boiling water is often used by dyers for partially stripping an overdyed material which has been dyed with direct colors. Altogether much credit must be given to the Irish

(Continued on page 95)

Proceedings of the American Association of Textile Chemists and Colorists

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DECEMBER MEETING OF PHILADELPHIA SECTION

The regular December meeting of the Philadelphia Section of the American Association of Textile Chemists and Colorists was held Friday, December 14, 1923, in Philadelphia. At 6.45 P. m. sixteen members sat down to dinner at the City Club of Philadelphia; an enjoyable hour and a half was passed. The meeting was called to order by Secretary Bertolet, in the absence of Dr. Rose, at 8.15 p. m. A. R. Thompson, Jr., was appointed Secretary.

The minutes of the previous meeting were read and approved.

Elmer C. Bertolet spoke briefly about the annual meeting held in Providence, R. I. Dr. Hollander moved that this Section invite the officers and councilors of the A. A. T. C. & C. to consider Philadelphia for the annual meeting in 1924. This motion was carried unanimously.

An opportunity was given to nominate officers from the floor, if any member so desired. No further nominations were made. Secretary Bertolet asked to have his name withdrawn as a nominee for Secretary; he also read a letter from Charles F. Goldthwait, who requested that, owing to the distance from Philadelphia, his name be withdrawn as a nominee for Chairman. A motion to proceed with the balloting was carried and the following judge and tellers were appointed: M. H. Wertheim, J. H. Hennessey and W. G. Hamlen, Jr.

H. S. Drum, of Smith, Drum & Co., Philadelphia, presented a very interesting and instructive paper on "Hosiery Dyeing Machines," illustrated with lantern slides. (This paper is published in full herewith.)

Richard C. Spurgeon, of the Philadelphia Silk Dyeing Company, read a very instructive paper on "Hosiery Dyeing and Its Problems," which also appears in full herewith.

A rising vote of thanks was tendered the speakers of the evening.

The following officers were elected for the ensuing year: Chairman, Dr. Charles S. Hollander; Secretary, Percival Theel; Treasurer, Elmer C. Bertolet; Sectional Committee, Dr. R. E. Rose, C. E. Mullin, Ralph MacIntyre and Charles F. Goldthwait.

The Section adopted the constitution as revised by the By-laws Committee. The meeting adjourned at 10.30 p. m.

There were forty present.

A. R. Thompson, Jr.,
Secretary pro tem.

HOSIERY DYEING AND ITS PROBLEMS*

By Richard C. Spurgeon

In discussing hosiery dyeing and its problems we must always hold in view the fact that these methods and problems are very numerous; that they differ in

*A paper presented before the Philadelphia Section of the A. A. T. C. C., December 14, 1923.

almost every individual case because of the varied training each dyer has had; and we must consider the different adverse conditions in every dyehouse. One dyer must combat hard water; another has mechanical problems; another has poor lighting conditions to deal with; and so forth. Of course, we cannot solve all problems encountered by all dyers in the few minutes allotted to this paper; nor can we give all the methods of dyeing the several kinds of hosiery, for they are practically unlimited.

In the days of the near and far past each individual dyer had his formulae and his secrets, which were kept under "lock and key" or in his hip pocket, and the man who received these magic recipes or formulae as his heritage was fortunate indeed. This sacred and unapproached book usually descended through their immediate families, generation after generation. But to-day all the mysteries of the past in dyeing are disclosed to the present and the future, and so to-night we are able to discuss freely and openly "Hosiery Dyeing and Its Problems."

The dyeing of each kind of hosiery is a study in itself—especially the three-fiber hosiery, of which we will speak later. The method we will give as a standard or basic method for each class is the result of having tried all the ways that are known generally and some that are original. These methods that will be given specifically are the most efficient of which we know. They are being used by the speaker with excellent results in a job dyehouse where speed, accuracy and consistency are required.

They are the conditions every dyer would like to enjoy day in and day out—that result in swift, accurate, consistent dyeing. Unfortunately, we cannot have everything "rosy" all the time; so the best one can do is to select, after much experimenting, the methods best suited to one's dyeing requirements and machinery.

Mr. Drum has very ably discussed hosiery dyeing machinery, and I wish to say that for dyeing any or all kinds of hosiery the paddle machines are far superior to any of their kin. They produce absolutely level dyeing; the goods may be shaded with unusual rapidity and loaded and unloaded quickly and easily.

In discussing problems we will have to confine ourselves to those met with in every lot of hosiery dyed. We will concern ourselves chiefly with the problems of obtaining even penetration, level dyeing, speedy and consistent work. The matching of shades we will not consider, for that rests entirely with the dyer, the lighting conditions, the fabric being matched and the dyer's knowledge of the properties of dyestuffs.

The chief troubles encountered in dyeing full-fashioned and seamless all-silk or silk and mercerized cotton hosiery are lack of penetration in the seams, heels and toes, that become "turned in" and folded, and unevenly distributed dye. These troubles are easily overcome if the dyer will change his usual method of boiling off first to the degumming or "boiling off and dyeing at the same time" method. This is the cure-all method of dyeing pure silk hosiery, and I am convinced that the time has come when every hosiery dyer should "dye and degum" his goods at the same time. The same dyes are used in this method as in others—direct and neutral working acid colors. Usually the silk requires from two to three times as much color as in usual methods, but the cotton is "filled up" more easily and the silk is more lustrous because of the absorption of oil and the prevention of friction brought about by the presence of the soap or the degumming oil in the bath.

The method is a very simple one. The only difficulty it entails is that sometimes extremely hard water will precipitate the oil or soap used. The question arises: Which is best fitted for this work—boil-off oil or soap? The oil, which is usually a mixture of sulphonated castor oil and silicate of soda, accomplishes everything soap does and, besides, leaves the cloth with a high luster and soft "feel," and does not break up in hard water, providing a high-grade oil is used. I prefer, for these reasons, boil-off oil.

The procedure for this method is as follows: The goods are "wet out" well in boiling water for about ten minutes; then the temperature of the bath is lowered to 120 deg. Fahr. and the necessary amounts of boil-off oil and the well dissolved and strained dyestuffs are added to the bath. The goods are worked for five minutes at this temperature, and then the bath is heated to the boil. At this point it is well to sample the goods, for one can tell if his shade is developing as it should or not. The silk usually appears too full; but as the gum is boiled out and the color boiled in, the shade gradually reaches a point of equilibrium. The cotton, if present, may be shaded from this point, but if it is near the shade the lot should be allowed to run ten minutes at the boil before making additions. The time to begin shading the silk is a matter of nearness to shade at a given time and of experience with this method. Usually, after twenty to twenty-five minutes boil the goods may be shaded. After about thirty to thirty-five minutes' boil the seams are thoroughly penetrated and the additions may be made every five to ten minutes with the certainty of level results.

You have noticed, no doubt, that we have omitted the usual additions of salt; we have made this omission purposely. This assistant should be left out entirely on light and medium shades when best results are desired, and only added when it is absolutely necessary.

as it usually is on cordovans, gun-metal, navys, autumn browns, etc., and then should not be added until the seams are penetrated.

The adherents of this method are fast becoming more and more numerous, and when once tried an enthusiastic "convert" is added to the list.

When the dyer's formulae are once established, it usually requires from one to two hours to dispose of a lot, thus doubling, if not tripling, production.

The dyeing of colors on full-fashioned, mock-fashioned or seamless hosiery is carried out by this method, and the points in favor of the method are: Speedy penetration of all seams, heels and toes; absolutely level dyeing and better conditioned silk—that is, better lustre and feel; minimum redyeing, and increased production.

Next we will consider the dyeing of seamless and full-fashioned three-fiber hosiery, usually consisting of a mixture of art silk and tram silk in the body of the stocking and mercerized cotton top, heels and toes. This hose may also be dyed in the boil-off bath, but more consistent and more solid results are obtained by degumming the silk first and then dyeing; and we recommend the degumming oil for this purpose, for the same reasons given before.

The relative amounts of artificial silk and tram silk vary according to the manufacturer's desires. When the hosiery to be processed contains mostly artificial silk, the best results in dyeing are obtained by using colors that are strictly "union colors." That is, they must have the same affinity for each of the fibers in the presence of each other in the dye bath. Of course, the dyestuffs selected will vary as the shades vary, and lists of these colors may be obtained from any dyestuff manufacturer.

Before we proceed any further I wish to say that the perfect dyeing of three-fiber hosiery in solid or mixed effects requires, on the part of the dyer, first of all, a very extensive and intensive knowledge of the working properties of dyestuffs under all conditions, and those who desire to enter hosiery dyeing as a profession would do well to equip themselves with this knowledge.

After degumming the hosiery it is washed well and the bath is prepared at about 120 deg. Fahr. The necessary amounts of color and some sulphonated castor oil, about ¼ to ½ per cent, are added. The goods are entered and the temperature raised to the boil, where it is well to sample for reasons stated before. After boiling for about ten to twenty minutes the goods are sampled and usually in light shades the art silk appears empty. At this point common salt is added to force the color on the artificial silk and produce a more solid effect. Common salt is a very important factor in this dyeing, for it is of prime importance in producing solidity between the cotton top and the body of the stocking. But when shades such as log cabin, field mouse, gun-metal, etc., are being dyed, it is most beneficial to use only a small amount of Glauber salt as an assistant.

When we approach shades such as cordovan and navy blue, the method changes entirely. The best results are produced in a concentrated liquor of a ratio of 15 to 1. The bath should contain about 10 per cent of sulphonated castor oil, and here it will be necessary to shade the tram silk with neutral working acid colors. The goods should be dyed at the boil to give perfect penetration.

If the tram silk should absorb too much dye and the stocking look mottled or freckled, by adding some soap or boil-off oil to the dye bath the art silk may be shaded to the desired effect below the boil.

Often the manufacturer will substitute the viscose artificial silk with Tulize art silk. This silk is a little lower priced than the viscose, and runs better when a number below 150 Denier is wanted. The hosiery containing this silk is indeed a hard proposition to dye satisfactorily, especially when the goods are plaited. But by dyeing in the degumming bath and salting the direct color in the bath on the art silk very satisfactory results are obtained.

The dyeing of heather effects on three-fiber hosiery may be done in three ways: The art silk and mercerized cotton are dyed in the soap bath, usually the boil-off bath, with colors that leave silk white; then washed well and cross-dyed at a lower temperature—usually 120 to 140 deg. Fahr.—with neutral working acid colors. Or they may be dyed in one operation; that is, the three fibers are dyed their respective shades at the same time. Another interesting method that is little known is the dyeing of silk-white effects with sulphur colors in light shades. This method is as follows: The goods are wet out well at the boil. When the temperature of the bath is made at 170 deg. Fahr., the necessary amounts of sulphur colors, sodium sulphide, soda ash and common salt are added and the lot run for about half an hour at 170 deg. Fahr. The hosiery is washed well. After the completion of dyeing, the silk is degummed. The gum is left in the silk before dyeing because of its protective properties against the alkaline bath.

Hosiery consisting of art silk and wool, or cotton and wool, is dyed with union-dyeing direct colors and neutral-dyeing acid colors. Hard water has a very direct influence in solid effects on this class of hosiery, inasmuch as its presence causes the direct colors to boil very readily on the wool, sometimes producing undesirable heather effects. This is easily corrected

in the bath before the goods are entered for dyeing. The chief trouble encountered in dyeing these goods is shrinkage of the stockings after they have been worked for a longer period than usual. This is usually caused by the use of too strong an alkali to remove the grease in the wool or the throwing oil present. The best material that can be used for scouring woolen hosiery is a mild scouring oil made for that purpose.

Hosiery consisting of tram silk and wool is another class of hose that requires careful study. The dyer is required to produce many varied heather and solid effects on it.

Sometimes the silk contained in the hose is boiled off before being thrown with the wool, but when it is in the gum it should be degummed. This process is usually done at 170 deg. Fahr. with boil-off oil, previous to dyeing.

The dyestuffs used to dye silk and wool hosiery are: direct colors, acid colors, and neutral-working acid colors. Solid effects are produced easiest and best with direct colors, while heather effects and silk-white effects are best produced with the latter.

The method for dyeing heather effects is as follows: The required amount of dyestuff and about 5 to 20 per cent of acetic acid, depending on the depth of shade, are added to the bath and the temperature made 120 deg. Fahr. The well-scoured material is entered at this temperature and raised to the boil, where the wool is shaded to the desired effect. Then the temperature is lowered to 140 to 160 deg. Fahr. and the silk is shaded at this temperature with neutral-working acid colors. Temperature control is a very important factor in controlling these effects, and should be watched carefully.

HOSIERY DYEING MACHINES*

By Harry S. Drum

[*Editor's Note.—Reproductions of the lantern slides shown by Mr. Drum and referred to in his paper could not be obtained for publication. A good deal must, therefore, be left to the reader's inference.*]

Mr. Bertolet has given me twenty minutes of your time this evening to talk on hosiery dyeing machines. In order that I may not take more than the allotted time, I am going to drop all the usual preliminaries and get down to brass tacks at once. If I seem to jump too abruptly from one subject to another as I go along, I ask that you blame Mr. Bertolet for not giving me more time. I had to cut out all unnecessary words and only hit the high spots in order to keep within his twenty-minute limit.

In thinking over this subject I have tried to eliminate all the dull, uninteresting points and have confined myself mainly to the one redeeming feature; that is, the big change in design and construction of modern hosiery dyeing machines as compared to the old-time machines.

We are probably all familiar with what we might call the stone age of hosiery dyeing, or any other dyeing for that matter, when any hole in the wall was good enough for the dyehouse and any kind of equipment was considered good enough, price being the deciding factor between one cheap machine and another. Or, in a great number of concerns, it just so happened that when they needed a new machine they would call in a hatchet-and-saw man and he would knock together some sort of a rumbler or tub, and that job was done.

But when conditions changed and even the factory girls considered it an absolute necessity to be dressed in full-fashioned silk hosiery to go to work, and the number of standard colors increased from a very few to several hundred, then equipment and conditions in the dyehouse also changed. Nothing shows the wonderful increase in the production of silk hosiery so well as the "ad" which appeared in the papers on November 24 calling for a hosiery dyer to take charge of a dyehouse with a capacity of 15,000 pounds of silk hosiery per day. This is in striking contrast to a few years ago, when silk hosiery was a luxury indulged in only by a comparatively few well-to-do persons. Instead of dyeing a few dozen pairs at a time, they are to-day dyeing as high as 1,600 pounds per batch.

Now, 1,600 pounds of silk hosiery means considerable money, and one batch spoiled is enough to make the average man realize that the very best machine he can buy is a very good investment.

So it was the enormous demand for delicate silk hosiery, with a wide range of colors, that brought about the big demand for a highly finished machine which would stay smooth, which was easily cleaned, which would not affect the dyestuff and which would be a permanent installation.

We—that is, Smith, Drum & Co.—noticed the gradual increase in this demand for such a machine, and about sixteen or eighteen years ago built our first machine of Monel metal. This metal is a natural alloy containing about 65 per cent nickel and 30 per cent copper, which meets all the requirements of being acid-resisting, easily cleaned and of taking a polish.

However, we were a little ahead of the times, for it was not until about eight or ten years ago that Monel metal dyeing machines really became what you might call universally used.

You are probably all familiar with the two main

*A paper presented before the Philadelphia Section of the A. A. T. C. C., December 14, 1923.

types of hosiery dyeing machines; namely, the paddle and the rotary types.

I will consider the paddle machines first. This photo shows a number of paddle machines as installed in the dyehouse of the Royal Silk Dye Works here in Philadelphia. This is the simplest in design and least expensive of all the Monel metal machines. It consists of a tank and a paddle, driven either by chain, as shown, or by belt, or directly connected motor. The tank is lined with Monel, the paddle is of Monel, and perforated false bottom covering the drain and steam pipes are of Monel metal. So wherever the goods touch you have Monel metal.

The rotation of the paddle sets up a strong, steady current which lifts and carries the goods along. This action is exactly the same in this machine as in the most elaborate designs of paddle machines.

This shows our latest type paddle machine. It is an old design electrified and made to operate automatically. It consists of a wood tank lined with Monel metal, a Monel metal paddle and a Monel metal cage. The paddle is rotated by direct-connected motor, and the cage and paddle are raised by another motor on the back of the machine. Pulling this lever forward or pushing it back is all that is necessary to raise or lower both cage and paddle. Travel in both directions is automatically controlled.

You can see that this machine is a further development of the type of paddle machine installed in the Royal Silk Dye Works, and has several advantages not embodied in the other type machine. Here it is possible to raise the goods out of the liquor when making additions to the bath. Then the operator can stir up his bath and be sure of a perfect color distribution before lowering his goods back into the tub. This is a very great advantage, because it positively prevents the additional dyestuff going on unevenly. Another thing, when sampling the batch you can raise the goods out of the bath so that they are not dyeing during the time taken for the washing, drying or comparing of the sample with your standard. When the batch is finished, raise the cage and the goods can be dropped into a truck placed in front of the machine.

This photo shows about a dozen of these machines in the dyehouse of the Taubel, Scott Company, at Riverside. These are of a somewhat older design, the cage being raised by means of a pneumatic hoist secured to the roof timbers. The principle of the machine is the same.

This shows a battery of paddle machines in the James J. Diamond dyehouse, Philadelphia. Here you have the cage designed to lift completely out of the tank instead of pivoting. The goods which are in the Monel basket are transferred from one tank to the other by means of an overhead traveling hoist. This design is used for a process such as Developed Black, where there are a number of treatments, and where it pays to keep a standing bath. This same design machine built of iron is also used for Sulphur Black.

The advantages of this machine are: Transferring the goods quickly from one treatment to another; greater production, because no time is lost in waiting for tanks to drain and fill; and easy handling of large batches. To unload, pull the door latch and the goods will drop into a truck placed below.

I have shown you the three different designs and have explained the reasons for each type. Now, I would like to say a few words in a general way about the paddle machine. You will find that some dyers claim the paddle machine is the best machine ever built, while others will not handle one on any account.

I walked into the office of a hosiery concern the other day and it so happened that a salesman was there talking to the boss dyer. This salesman represented a concern which builds only the rotary machine. As I came in he said to the dyer, "What kind of machines are you using?" The dyer said, "Paddle machines." "Oh, Lord," the salesman said. "Why, you are sixty years behind the times." The dyer said, "I don't care if Methuselah dyed his whiskers in them, the paddle machine is still the best for hosiery." So, because of the lack of time, I won't argue the merits of either to-night, but will give you just the main difference between the two and let it go at that.

A paddle machine is much more quickly loaded and unloaded than the rotary machine, because there are no doors to be opened and closed.

Due to the circulating action of the paddle, any addition made to the bath is much more quickly and more evenly distributed throughout the bath. And the bath is stirred up so that there will be no chance of the dyestuff going on unevenly.

The open design of the machine permits much easier and quicker cleaning.

Half-hose can be dyed open; ladies' goods must be dyed in nets.

Some complaint has been made that the paddle machine roughens the silk threads. However, since redesigning our paddle we believe we have overcome a great part of the trouble from this source. All our paddles are now built with the front edge of the paddle blade turned back over a Monel metal rod. This gives a round edge which is very smooth, instead of the sharp edge studded with rivets, as in the old design.

This is all I have to say regarding the paddle machine, and I will now go on to the rotary machines.

This picture shows the old wood machine which was

in general use previous to the adoption of Monel metal.

The rotary machines, same as the paddle machines, have been redesigned within the last few years so that our latest type machine bears little resemblance to this old-style wood machine.

Then we have the old-style Monel metal machine, having a wood tank lined with Monel metal and a Monel metal cylinder divided into a number of pockets by Monel metal partitions. This particular machine shown was brought back to our shop after being in use for eleven years at the Phoenix Dye Works, Philadelphia. We rebuilt the tank and drive, and put it back into service again, as good as new. The cylinder did not show the slightest sign of wear.

Now we come to the latest type machine we have built. This is our 300-pound capacity machine which has a Monel metal tank, a Monel metal cylinder, and is driven by direct-connected motor.

In this machine we have tried to combine all the advantages of both the paddle and rotary machines. It is designed especially for dyeing light colors on fine silk goods, with or without the use of hosiery nets.

We might say that this machine is the result of our thirty-five years' experience, devoted exclusively to the building of hosiery dyeing machines. It embodies a great number of features never used previous to the designing of this machine, a few of these features being:

A high liquor line, so that the goods are under the liquor at all times;

The inside of the cylinder is perfectly free of all projections;

Cylinder doors are sliding instead of hinged;

An overflow at the rear of the tank.

We will consider the tank of this machine first. It is of solid Monel metal, supported at both ends by bronze frames and further strengthened by ribs running the full length.

At the rear of this tank is placed an overflow which runs the full length of the back of the tank. Flooding the machine by means of an inlet at the front of this end washes out all dirt and gum before draining. If the machine is drained while this foreign matter is in the liquor, it is all deposited on the goods, which act as a sieve to strain all liquor passing through them. Steam pipes enter from both ends of the tank. This insures even heating at all parts of the bath. Notice that there are no stuffing boxes.

Now to consider the cylinder. This line drawing gives you a good end view, showing the relation of the cylinder to the tank. There are several advantages in having the cylinder low in the liquor. First, it permits running a long bath, which helps in light shade dyeing. Second, as the cylinder revolves in a low liquor line machine the goods are lifted out of the liquor and finally slide and roll down the partition plate. This causes tangling and roughing of the goods. With the high liquor line the goods float across instead of rolling, and because they float they tend to open up instead of tangling. So we may say that this high liquor line eliminates roughing and tangling of the goods.

In the construction of the cylinder we eliminated every projection from the inside. There are no locks, angles, rivet or bolt heads which might develop thin edges to catch and tear the goods. All perforations and the entire inside surface are highly polished to eliminate any chances of pullers.

Sliding doors on the cylinder are one of the big improvements on this new machine. We found that with hinged doors there was a chance for the careless workman to start the machine without locking the cylinder door. The result was that the door fell open, caught under the steam pipes in the bottom of the tank and caused considerable damage. This cannot happen with the sliding doors, which lock automatically when closed. Another advantage is that this door is supported at every inch along all four sides. There is no chance for the door to spring and pinch the goods. Every part of the drive is mounted on a heavy cast-iron base plate. This provides a good foundation for the bearings of all moving parts, preventing excessive wear due to the parts getting out of alignment. All overhead work has been eliminated.

We drive direct onto gears on the ends of the cylinder. This method of driving eliminates the necessity of stuffing boxes and relieves the cylinder of the strain which is bound to occur when the direction of rotation is reversed.

All these machines are equipped with a dye-feeding device. This device is connected to the perforated steam pipe so that any additions to the bath are introduced in the form of a spray by means of the steam pressure. This permits a more even distribution of the additional dyestuff throughout the bath so that it will not be taken up unevenly.

Every machine is equipped with a mercury thermometer and with unloading plates which bridge the gap between the tank and cylinder.

I find that time is getting short, so I will just show you views of several dyehouses and then will call it "quits."

This shows a 500-pound capacity Sulphur Black outfit as installed in the dyehouse of James J. Diamond, Philadelphia. The goods are dyed in the first tank, washed in the second and soaped in the third.

This shows the same sort of an outfit in the dyehouse of the Taubel, Scott Company, at Riverside, except that these machines have a capacity of 1,200 to 1,500 pounds per batch. With this outfit three men turn out 9,000 to 12,000 pounds of goods per day.

I hadn't mentioned the Sulphur Black machines before, because the only change in these machines was to give greater production with less labor.

Here we find both rotary and paddle machines in the Schulze Dyeing Company, of Reading. You will find a great number of concerns that use rotary machines for silk and paddle machines for wool hosiery. This is because the paddle machine is much easier on wool goods. [Several other views were shown.]

This about finishes all I have to say on this subject, except that my object in going into detail regarding the construction of our latest rotary machine was to show the wonderful advancement in the design of hosiery dyeing machines. The views of the different plants were only to give you an idea of the great difference in the working conditions as compared to the old-time idea that anything was good enough for the dyehouse.

The latest dyehouse equipped by us is that of the Thieme Bros. Company, Fort Wayne, Ind. The walls inside are of white tile or enameled brick, which can be washed instead of painted, and every piece of pipe is of brass instead of iron. It looks like a palace compared to some of the old-style dyehouses.

I might add that whenever any of you men are in our neighborhood we would like to have you stop in to say "hello" and we will be glad to show you our machines under construction.

I thank you.

TWENTIETH COUNCIL MEETING

The Twentieth Council Meeting of the American Association of Textile Chemists and Colorists was held Friday, January 18, 1924, at the Engineers' Club, Boston, Mass.

The following members were in attendance: L. A. Olney, William D. Livermore, William H. Cady, George A. Moran, William R. Moorhouse, W. M. Scott, W. C. Durfee, A. E. Hirst, R. F. Culver, W. J. Murray and W. E. Hadley.

Considerable time was spent in a discussion of the data which are to appear in the coming Year Book, it having been decided that the apparent success of the previous issue warranted the publication of the 1924 edition.

In connection with the above, a questionnaire is being prepared which will shortly be sent to each member, and it is the sincere desire of the Council that each member will make a special effort to promptly fill out same and return with as complete data as possible.

The following applicants were admitted to membership:

Active Membership

Alvater, Raymond, Grant Avenue, Beechwood Heights, Bound Brook, N. J. Textile colorist, Calco Company.

Bayer, Richard, 202 Wentworth Avenue, Edgewood, Cranston, R. I. Salesman and demonstrator, National Aniline & Chemical Company.

Bohl, Edward, Jr., 34 East Fifth Street, Paterson, N. J. Silk dyer, National Silk Dyeing Company.

Brown, G. Arthur, Harris Avenue, R. F. D. No. 34, Route 1, Bound Brook, N. J. Textile chemist and colorist, Calco Company.

Burnett, Raymond L., 709 Hospital Trust Building, Providence, R. I. Demonstrator and salesman, Du Pont Company.

Clay, Tom, P. O. Box 51, Crompton, R. I. Superintendent dyeing and bleaching, Crompton Company.

Demers, William J., 1294 Main Street, Worcester, Mass. Boss dyer, Worcester Woolen Mill Company.

Elmore, Frank H., P. O. Box 666, Providence, R. I. Manager Providence office, H. A. Metz & Co.

Gardner, J. Elbridge, 240 William Street, Orange, N. J. Works chemist, Clark Thread Company, Bloomfield, N. J.

Graham, George E., 180 West Eighty-second Street, New York City. Colorist, Waring Hat Company, Yonkers, N. Y.

Hanke, Ernest E., Lincoln Bleachery & Dye Works, Lonsdale, R. I. Chemist.

Keeler, Edwin A., 35 Martin Road, Verona, N. J. Colorist, Newport Chemical Works, Passaic, N. J.

Kelley, Robert V., 128 Morton Avenue, Woonsocket, R. I. Dyer, Rosemont Mill.

Krebs, Charles G., 78 Gilbert Street, Woonsocket, R. I. Dyer, Rosemont Mill.

Lilley, S. Clark, 270 Benefit Street, Providence, R. I. Dyer and chemist, Gerald Cooper Company.

Magner, John J., 238 Cumberland Street, Brooklyn, N. Y. Overseer of dyeing, Meyers Lipman Wool Stock Company.

Mitchell, Richard M., 76 East Main Street, Webster, Mass. Mill superintendent, S. Slater & Sons.

Newell, Richard F., c/o Ciba Company, Cedar and Washington Streets, New York City. Colorist.

Northup, George A., Jr., 27 Third Street, Haverstraw, N. Y. Chemist, Rockland Finishing Company.

Peacock, William H., 372 Fifth Street, Brooklyn, N. Y. Textile chemist, Calco Company.

Powell, John, Weiss, Willheim Company, Inc., Passaic, N. J. Superintendent print shop.

Zillessen, Walter H., Newport Chemical Works, Passaic, N. J. Colorist.

Junior Membership

Brosnan, William F., 38 Second Avenue, Lowell, Mass. Student, Lowell Textile School.

Buchan, N. S., Lincoln Street, Andover, Mass. Student, Lowell Textile School.

Cote, Theodore, 61 Main Street, Groveland, Mass. Student, Lowell Textile School.

Donaldson, Edwin R., 19 Madison Street, Taunton, Mass. Assistant chemist, Mount Hope Finishing Company, North Dighton, Mass.

Goosetrey, Arthur, 58 West School Street, Woonsocket, R. I. Dyer, Rosemont Dyeing Company.

Herrmann, Albert E., Jr., 90 Mount Vernon Street, Lowell, Mass. Student, Lowell Textile School.

Meeker, Samuel, 248 Foster Street, Lowell, Mass. Student, Lowell Textile School.

Hyman P. Selya, chemist of F. E. Atteaux & Co., Boston, Mass., was changed from Junior to Active Membership.

W. E. HADLEY, Secretary.

CHANGES OF ADDRESS

Appel, William D., Bethesda, Md.

Bromley, Frank, 230 Fifth Avenue, New York City.

Caya, F., 66 Westland Avenue, Boston, Mass.

Chase, R. L., Hotel Le Marquis, 16 East Thirty-first Street, New York City.

Clapham, Harry, 167 Sherman Street, Passaic, N. J.

Davagne, P., 502 Hague Street, West Hoboken, N. J.

Peacock, William H., 415 Marshall Street, Elizabeth, N.J.

APPLICANTS FOR MEMBERSHIP

The following is a list of names of those who are making application for membership in the Association:

Active Membership

Delhanty, G. W., textile dyer, Taunton, Mass. Sponsors: G. Stewart and W. Allen.

Fleming, L. J., vat dyer, Defiance Bleachery, Barrowsville, Mass. Sponsors: J. G. Stott, Jr., and R. F. Culver.

Genssler, O. H., technical manager, Sandoz Chemical Works, New York City. Sponsors: E. H. Killheffer and C. F. Schaumann.

Shorey, Michel L., demonstrator, Oakley Chemical Company, Providence, R. I. Sponsors: R. F. Culver and W. E. Mitchell.

Junior Membership

Streckfuss, Fred C., student, Philadelphia Textile School. Sponsors: E. C. Bertolet and P. Theel.

Walsh, Frederic C., student, Philadelphia Textile School. Sponsors: E. C. Bertolet and P. Theel.

TRANSFERRED FROM JUNIOR TO ACTIVE MEMBERSHIP

Selya, Hyman P., 10 Littell Road, Brookline, Mass.

ASSOCIATION BADGES

Those who attended the Annual Meeting of Providence had an opportunity to examine and purchase the new lapel button badges which were there distributed by the Secretary.

For the benefit of members who were unable to attend the meeting an illustration of the badge is shown herewith.

The three "rings" are enameled in red, yellow and blue, respectively, and the initials and border are brought out in gold. The general effect is exceedingly attractive.

Badges may be secured at $1.50 each by addressing the Secretary.

WALTER E. HADLEY,
5 Mountain Avenue,
Maplewood, N. J.

DRESS LINENS

(Continued from page 86)

linen dyers for the high excellence which they have attained in their effects.

Dress Linen Finishing

Undoubtedly a dress linen finish has an individuality all its own. Fillings are not permitted, and only in exceptional cases can the use of softeners be excusable. Yet when handled costume linens must have a mellow clothy feel, entirely free from the slightest perception of hardness. It is just in attaining this finish that the French hitherto have excelled. It must always be remembered that linen fiber when heated is considerably more brittle than cotton. Hence before commencing any of the finishing operations the cloth should be thoroughly cooled, especially when it has to undergo stretching.

Moisture is a very important factor in the finishing of a dress linen. Indeed, if more attention were paid to the moisture content there would be fewer complaints from customers as to the hard feel which some costume linens reveal. It does not seem to be practically recognized that moisture is an admirable softener of fabrics.

It may be interesting to follow a linen piece, i. e., a web of 70 yards, through its finishing processes. We may presume that it has been already dyed, dried and cooled, so now it is damped on one side (full water) and permitted to lie rolled up in four-piece batches for 12 hours. Afterwards these pieces are stretched out to width, and then allowed to lie in this loose state in a cool place for a few hours. Now the pieces are ready for making up. However, another and even better finish is given by beetling. Here the cloth is stretched and then wound on the beetling beam six pieces deep. Then it is subjected for 30 minutes to the pounding of the massive wooden hammers, or beetles, before being changed and reversed, and the beetling again repeated for the same length of time. This beetling flattens out the individual fibers to close the interstices and give the linen a gloss akin to that of ironing. Wet-spun and dry-spun tow yarn fabrics call for much more attention and the beetling is in hour periods. Then it is examined for width and, if too narrow, slightly damped, rested, stretched, and then made up. There must be no reediness and no filling yet the cloth must be closed firmly.

Shrinkage of Dress Fabrics

It is possible that the Linen Research Institute may give some instructions anent shrinkage in linens but at present little definite is known. At any rate, no finisher can state beforehand just how much, or how little, any piece of linen will shrink when wetted. There are many affecting factors. We must consider thus, the quality of the raw material, the weave, construction, twist of yarns, reed and pick, tension during weaving, etc., hence it is very difficult to perform the operation of shrinking successfully.

In its broad lines it is performed by simply wetting the linen with water and then hanging it in a suitable place until the moisture evaporates. However, if the drying proceeds quicker than the threads of the cloth will adjust themselves the shrinkage will not be successful. This in a nutshell is the whole problem of shrinking fabrics. Some authorities maintain that it is possible to achieve the complete shrinkage of a cloth in one operation but practical experience proves otherwise. Indeed, repeated wettings and dryings are essential before the fibers in the cloth have reached their shrinking limit.

An Irish Method Described

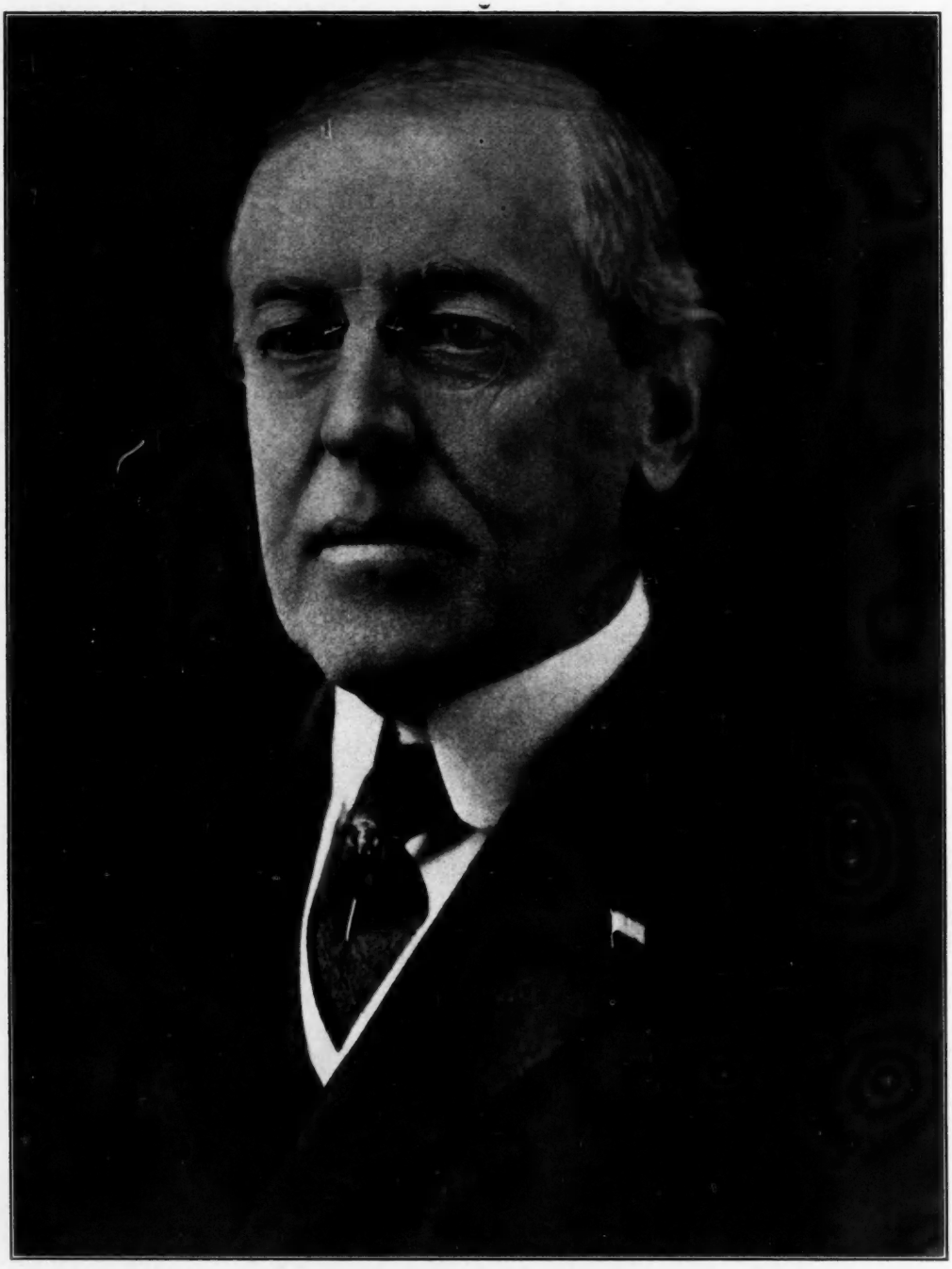
Here is one method practised largely by one of the largest Irish manufacturers of beautiful costume linens. First, the linen is cut into suitable lengths and steeped, in the loose state for 24 hours, and then it is dried slowly in the shade. When thoroughly dry it is again immersed in cold water for another 24 hours, and dried again slowly in the shade. Yet in spite of this process, in which the shrinkage is evident to some percentage, when the fabric has been cut into a dress or costume and laundered once it will still show some shrinkage. So it may be assumed that the complete shrinkage of a fabric cannot be attained in one operation.

Certainly in the tropics there is a process giving good results for shrinking white linen suitings and cotton ducks. Here the material is thoroughly soaked in cold water in the loose state for five days, then it is allowed to dry naturally during another five days. Afterwards it is steeped again for twelve hours in cold water, dried as before, and then hot-ironed. It is essential, of course, that a little moisture is left in the fabric before ironing, though too much or too little will not give perfect results. It seems that the rate of drying exercises some influence on the shrinking properties, as it has been found that fabrics dried in the cool evening have not shrunk in the same proportion as when dried in the middle of the day.

Most Dress Linens Are Uncrushable

For many years it was considered impossible also to produce linen for ladies' costumes which would not betray crushes where the wearer sat upon the folds. But patience and perseverance conquers most difficulties, and now it is almost possible to sleep in some of the Irish manufactured costume linens without any trace of wrinkling being exhibited. Altogether it is not surprising that costume linens have won so great a vogue. In fact, next year instead of the self colors there is every possibility that they will be seen in stripes.

Moreover, while the majority of dress linens are of all-flax yarns there are various union cloths obtainable. Thus many beautiful dress fabrics are now being sold with a mercerized cotton warp and linen weft. These are made in slate, cerise, tussore and cream. The contrast between the warp and weft gives the cloth an individuality and luster of distinctiveness.—Canadian Textile Journal.



WOODROW WILSON

AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

LOUIS A. OLNEY
PROFESSOR OF CHEMISTRY AND DYEING, LOWELL TEXTILE SCHOOL
Directing Editor

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WOODROW WILSON

ON Sunday, February 3, 1924, Woodrow Wilson, chief executive of the United States during the most titanic struggle in which mankind has ever engaged, wielder at one time of more actual power than any other individual throughout recorded history, educator, statesman and great citizen, passed away. As he lay in the third-floor room of his home in S Street, Washington, he said: "I am a broken piece of machinery. When the machinery is broken—" Here he paused, and, no doubt perceiving that his ebbing strength would not permit of further talk, murmured, "I am ready."

The machinery was indeed broken down. No longer could it respond to the commands of the tireless brain which urged it on. It was broken down by incessant, ruthless use in what few will now deny (political considerations being removed) was a sincere attempt to perform a great service for humanity. The fact that the visible results of that attempt fell far short of the ideal cherished in the heart of him who strove is not now vital. For the attempt was in itself a service of rare value in that it set a larger number of persons actively *thinking* about the abolition of stupid slaughter than any similar attempt to date, and Woodrow Wilson now may rest, comforted by the understanding that his appointed work in the orderly progress toward the inevitable goal was fully wrought and well.

And he who would deny that the goal is inevitable would deny history, which shows clearly, step by step, how men have been able to furnish the spectacle of larger and yet larger communities or groups who have found it possible to live without warfare or mass hatred among themselves. Little by little we grow more facile in the mechanics of arbitration, more skilled in the impartial, analytical adjustment of differences, and more quick to comprehend and accept the logic of such adjustments. Such ability has ever been and will ever be extended throughout wider and yet wider areas of population by continuous advancement in the sciences of bodily transportation and the communication of thought, and of the science of education. All these things make for unity of thought and belief concerning fundamentals, which is the goal itself.

We are doubtless many, many generations yet removed from this state, but history clearly indicates its approach. . . . By virtue of his position and the power he held, Woodrow Wilson chose to compel the whole civilized world to think and talk about the feasibility of a "League of Nations" at this time. . . . Hence, whether the ultimate result comes to be called by this title—which it probably will not—or by any other, the reality will be the thing that matters, and if he has succeeded in hastening it by even so much as one or two generations, the world will be infinitely richer in lives and property because he once lived. It is on this basis, and this alone, since he has passed on, that the work of the man should be appraised.

In the face of the many evidences of depth and vision furnished by his career, such charges of political maneuvering as may have found current favor in years gone by, melt away into absurd nothingness. He repeatedly demonstrated that his principal concern was with the facts, the truth, the fundamentals, and in proportion to his fondness for broadly democratic principles, he detested the petty artifices necessary to attain them by the wearisome, wasteful political route. His way was the direct appeal, as when he besought the voters to return a Congress which would work harmoniously with him during the stress of war and reconstruction. This was a grave mistake from the political standpoint—but an ideal way of stating the truth concerning a practical necessity.

Idealist though he may have been, the coal tar chemical industry yet had good reason to admire this very idealistic outlook. In the period following the war, the most savagely combative and exasperating obstacle that the industry had to contend with was politics, which did more to thwart, hinder, disrupt and confuse the struggling manufacturers than all the German propaganda at that time put together. From Paris, in his message to Congress, Woodrow Wilson cabled:

". . . there are parts of our tariff system which need prompt attention. The experiences of the war have made it plain that in some cases too great reliance on foreign supply is dangerous, and that in determining certain parts of our tariff policy domestic considerations must be borne in mind which are political as well as economic.

"Among the industries to which special consideration should be given is that of the manufacture of dyestuffs and related chemicals. Our complete dependence upon German supplies before the war made the interruption of trade a cause of exceptional economic disturbance. The close relation between the manufacture of dyestuffs on the one hand and of explosives and poisonous gases on the other, moreover, has given the industry an exceptional significance and value.

"Although the United States will gladly and unhesitatingly join in the program of international disarma-

ment, it will, nevertheless, be a policy of obvious prudence to make certain of the maintenance of many strong and well-equipped chemical plants. The German chemical industry, with which we will be brought into competition, was and may well be again a thoroughly knit monopoly, capable of exercising a competition of a peculiarly insidious and dangerous kind."

The significance of the above was twofold. Primarily it showed that President Wilson was clear-minded enough to comprehend what many Congressman and Senators were wholly unable to comprehend, and it also indicated that he regarded the issue as important enough for the leader of the traditionally low-tariff Democratic party temporarily to discard or thrust aside one of the tenets of his party—namely, no special protection.

Had he been thinking in terms of politics only, Woodrow Wilson would never have written those paragraphs, nor would he have repeated it in substance during the course of his message to the third session of that same Congress. And that it had its effect, even though the new tariff was finally drafted by a Republican administration, no one will dispute.

The passing of a former President of the United States, though covered voluminously in the daily press and other periodicals, is a fit subject for consideration and remark by any trade or technical publication in this broad land. . . . But because it will be so much better done elsewhere, and because space forbids, it is scarcely desirable to review his life's work here.

That life's work is done, and whether in agreement or disagreement with the man's policies, methods or beliefs, his lofty purposes and the unquenchable zeal which wore his body out, command respect. It is good to know that since he could accomplish nothing more, he has at last found rest.

We salute Woodrow Wilson, or his spirit, and wish him well.

REPORTED ANGLO-GERMAN DYE AGREEMENT

NEWS dispatches emanating from London, reporting that an agreement has been reached between the British Dyestuffs Corporation and the Interessen Gemeinschaft, looking to a close affiliation between these concerns for both manufacturing and selling purposes, were recently published in certain daily papers in this country and Canada. A cable dispatch to the New York Times and Montreal Gazette was as follows:

> The British and German dye industries have reached a provisional agreement for a division of profits and markets, which is likely to have far-reaching consequences.
>
> The British Dyestuffs Corporation, which is partly subsidized by the British Government, is to have control of the British market and a share of the overseas markets, both foreign and colonial, says the Evening Standard, in making this announcement.
>
> The German company, the Interessen Gemeinschaft, will afford information about its secret processes, advise on technical matters and receive in return a share of profits of the British company, which will guarantee its clients that such productions shall not be sold in Britain at higher quotations than sold abroad.
>
> The negotiations, which the British Government has approved, have been going on for two years, since the first overture was made by the Germans, who admitted that the British industry had become a formidable factor in world competition. Meetings have been held in Paris and Berlin and have culminated in the completion of a draft of the agreement.

An endeavor to substantiate the correctness of the above report has met with little success. It is probably premature to say that the agreement has been finally consummated, but it is well known that negotiations of this character have been under way for some time past.

If such an agreement is actually effected, there is little doubt that it will be of marked advantage to the I. G. Just where the British Dyestuffs Corporation will land is, however, another matter. Stockholders of this latter corporation may very likely find themselves in a somewhat better position than has recently been the case. The corporation may earn and pay dividends but there seems very little doubt that its identity as a purely British concern will disappear.

Since Sir William Alexander assumed direction of the policies of the British Dyestuffs Corporation it has been evident that his main purpose has been to place the corporation on a profitable operating basis. Sir William is an eminently capable industrial executive, and, like most men of this type, feels that his first duty is to his stockholders and that if he cannot earn dividends for them he is not serving them properly. Moreover, like most Englishmen, he is inclined to forget the war and its animosities as quickly as possible and get down to business.

In making an alliance with the Cartel the possibilities of operating the British Corporation on a profitable basis will unquestionably be greatly enhanced. One after another the members of the technical staff of the British Dyestuffs Corporation have resigned, with the result that it is by no means well equipped to prosecute the vigorous manufacturing and research program which is necessary if the corporation is to accomplish the somewhat ambitious program originally mapped out for it.

There is, however, another side to the picture. The Interessen Gemeinschaft, by virtue of long experience and conceded ability in the manufacture and sale of dyestuffs throughout the world, is in a position to dominate absolutely any similar enterprise with which it forms an alliance. By a process of infiltration the German industry would in very short order acquire complete technical control of any dyestuff manufacturing concern with which it became affiliated. In other words, we predict that if an agreement of the sort reported is actually consummated it will be a matter of but a few years until the

British dyestuffs industry is thoroughly subjugated by the German interests.

This may be good business from a financial standpoint but it is entirely unsound when viewed in a patriotic light. Similar overtures have been made from time to time to various American manufacturing concerns, and up to the present time have met with the rejection which they merited. It is to be sincerely hoped that none of the directors of our American dyestuff manufacturing concerns will allow themselves to be dazzled by a picture of immediate financial prosperity into establishing relationships with the I. G. which could have but one ultimate answer—the complete elimination of the American industry as a national entity.

COMPLETING A COLLEGE EDUCATION

M. W. Alling's article in this issue is a frank discussion of the college man's opportunities in the dyeing and bleaching industries. The article is written from the viewpoint of a man thoroughly experienced in dealing with the problems of which he writes. Because of this viewpoint his propositions for aiding in the training of college men for bleachery work are unusually simple and practical. There is the essence of a college education in his recommendation "that colleges and institutions of all kinds incorporate in their teachings the unseen standards set by the common laborer, so that the student worker will not find himself in an embarrassing position when called upon to meet them."

The whole question resolves itself into the more or less common opinion that "it all depends on the man himself." Men still dispute as to whether it is the man with the practical training derived from the "school of hard knocks" or the man with the college training, who reaches success the easier. Mr. Alling's opinions point to the almost obvious conclusion that it is the combination of both which should be the aim of the pursuer of success. College men who intend to enter bleachery work and mill men who hire college men should read Mr. Alling's article.

TURNER LEAVES NEWPORT

As of March 1st, C. N. Turner resigns as president of the Newport Chemical Works, Inc., to assume the duties of director of sales at the National Enameling & Stamping Company, a nationally known institution. Mr. Turner has been associated with the Schlesinger interests in various capacities for fifteen years, so that the severance of his relations will be keenly felt by all his former associates.

The business of the Newport Chemical Works, Inc., will be carried on as heretofore under the direction of Dr. E. H. Killheffer, vice-president.

T. C.'S COLUMN

THE DON'T-BELIEVES AND THE BASHFUL BROTHERS

I know a lot of fellows that know a lot of things that I don't know. They have spent years in contact with lines of work that I seldom touch. What they know isn't confidential or secret and when I come now and then upon an unusual problem, I wish I had a little of their experience. Were I to talk with one of them and perhaps ask him for advice his response would be free and generous, and I believe that most of our readers are ready and willing to pass along to a reasonable degree such particular knowledge as they may have.

However, when it comes to the more public ways of sharing their work with others, addressing the local section or writing for a journal, we seldom hear their names. Do they as a class, like one I know, not believe in such things? I do not think it is often so. There are few, if any of them, that sit back and think to themselves how much more they know than anybody else. Rather, is it not super or false, or some other kind of modesty? Some textile chemists are very critical of the other fellow and some are afraid of being criticized, but for every one that would adversely or minutely criticize his fellow's paper, there are a hundred of the newer generation who would read and reread, and enjoy and use all of its valuable contents.

Nobody wants to appear to be trying to tell all that he knows. Few of us, however, need to worry about that for one article or one talk in public by each one who has specialized on some subject would fill our programs indefinitely with interesting talks and would help to still further raise the standard of our publications. At some time each active textile chemist has occasion to investigate farther than usual into some problem, or to especially perfect himself in some minor line of work, for instance, identification of certain types of dyes, or, finally, his daily contact with particular kinds of bleaching, dyeing or finishing, has made him a specialist in them.

At some time, also, any other active textile chemist is more than likely to suddenly come upon one of these problems and must find a solution, often at the expense of a great deal of time and trouble. As a rule, he has to find it whether he can or not, but the way is far easier if a good paper on the subject can be found. Of course, the conditions surrounding the problem and its details may not be the same, especially if it is a manufacturing difficulty, but if it is a matter of a qualitative test or a method of analysis, the data may be applied bodily in their new environment and the author hailed as a benefactor.

The benefit isn't all one-sided either. If invited to write or speak, we all feel obliged to act a bit indifferent, and to display our natural modesty whether we really

feel that way or not, but even at the risk of a little polite hypocrisy, the invitee should speedily accept as he himself will gain valuable experience as well as a little advertising.

There are honest differences of opinion throughout textile work, and, as in politics, the majority is not always right. Therefore, bashful brother, do not mind if you do not agree with the crowd or with some big authority in it, for you may be nearer right than any of them.

Everyone of intelligence knows that we all cannot agree on textile matters. At the same time we may not exactly disagree, although experience has led to differences of opinion. Every textile audience or reader knows this perfectly well and makes due allowance. As a rule, your remarks will arouse no more skepticism than you feel when listening to other people. Therefore, do not hesitate to join in the discussion, often the best and most interesting part of a program.

To summarize our plea, lend a hand for mutual help and if the "powers that be" do not see your light concealed beneath its modest bushel, I can tell you from observation and experience that editors and society officers have a little extra appreciation for volunteers.

Technical Notes From Foreign Sources

Manufacture of Effect Threads with Animal Fibers

A British patent has been issued on a new process for manufacturing effect threads with animal fibers. Wool and other animal fibers have a greatly diminished affinity for acid dyestuffs after treatment with esters of tannic acid, which are capable of being subsequently fixed by means of stannous and other metallic salts. When such esters are replaced by tannic acid, the resulting resist effect is less permanent to washing and milling. Completely esterified tannic acid is insoluble in water, and is therefore not suitable.

For example, wool or silk is treated in a dilute bath for one hour with 30 per cent (calculated on weight of the tannic acid used) of a mixture prepared by heating for one hour 100 parts of tannic acid with 120 parts of glacial acetic acid and 50 parts of acetic anhydride at 90 to 100 deg. Cent. A small quantity of water is added toward the end of the reaction. The wool is afterward rinsed and treated for half an hour in a bath at 90 deg. Cent. with 5 per cent of tin crystals (stannous chloride) and 3 per cent of glacial acetic acid.

Use of Anti-Oxygenizers to Increase Fastness of Dyestuffs

An interesting article has recently appeared in a French textile magazine on the use of anti-oxygenizers to increase the fastness of light of dyestuffs on the fiber. The fastness to light of dyestuffs on wool, after treatment with a boiling 1 per cent solution of quinolsulphonic acid, whereby the wool absorbed about 3 per cent of its weight of this anti-oxygenizer, was increased in the case of eosin dyestuffs, for example, Eosin BB, Erythrosin B and Rose Bengal N. There was, however, no change, just a slight diminishing in the case of the nitro dyestuffs, such as Methyl Violet, Magenta, Malachite Green and Acid Violet, and basic azo dyestuffs, such as Chrysoidine and Bismarck Brown.

When quinolsulphonic acid was replaced by quinol, the fastness of eosin and triphenylmethane dyestuffs was considerably increased, but azo acid wool and basic dyestuffs were unaffected. The treatment with an anti-oxygenizer must be effected after dyeing, and its protective action is only evident when the amount of anti-oxygenizer present in the fiber is many times greater than the amount of dyestuff. The effectiveness of other anti-oxygenizers, including dyestuffs and copper salts, is discussed in relation to results previously obtained.

Fast Colors on Fiber

A German patent has been issued to the well-known dye firm of F. Bayer & Co. on a process for producing fast colors on textile fabrics. The fibers, which are first impregnated with 2.3 oxynaphthoic acid arylide, are treated with diazo-compounds of diaminoazo compounds which havve been alkylated with unsymmetrical substituted negative radicles. In the azo compound the azo group stands in the ortho position with respect to the dialkylamino group. These compounds are obtained when negatively substituted ortho amino-dialkylanilines, as, for example, 4-chlor-2-amino-1-dimethylamino benzol, 4-nitro-a-amino-1-dimethylamino benzene, 4-nitro-2-amino-N-methyldiphenylamine, etc., are diazotized and the diazo compounds are then coupled with another diazotizable aromatic amine, such as para-xylidine, 2-amino-4-methyoxy-1-methyl benzene, meta-aminoacetanilide, etc. In this manner violet to black colors are obtained which are fast to light, bleaching and washing.

Increasing Affinity of Artificial Silk for Dyestuffs

A French patent has been granted to the Badische Anilin and Soda Fabrik on a process of increasing the affinity of cellulose esters; that is, the various forms of artificial silk toward dyestuffs. For example, cellulose acetate silk is treated with saponifying agents with the addition of soluble aldehydes or oxyaldehydes and then the silk is dyed. Then again, the dyeing is carried out in a dye bath to which the saponifying agents and the soluble aldehydes are added

Thus, 2.5 grams of cellulose acetate silk is treated for a period of ten minutes at a temperature of approximately 60 deg. Cent. with 100 cubic centimeters of a solution of barium hydroxide of 5 deg. Be concentration, to which has been added 50 cubic centimeters of a 30 per cent solution of formaldehyde. Then the silk is dyed in a hydrosulphite dye bath with anthraflavon GC and other dyestuffs. In the place of barium hydrate solution it is

Files

also possible to use caustic soda lye. In the place of formaldehyde it is also possible to employ a solution of formaldehyde bisulphite, acetaldehyde, a solution of acetaldehyde bisulphite, formaldehyde sulphoxylate, glyoxal sulphate, glyoxylic acid. It is claimed that the finish and the luster of the cellulose acetate silk does not suffer from this treatment.

Sulphur Dyestuffs of Indigo Tint

A British patent has been issued to the Society of Chemical Industry of Basle on the manufacture of sulphur dyestuffs of indigo tint. These dyestuffs, which are fast to chlorine and which show a greenish reflection (thereby differing from Hydron Blue) are adapted for use in dyeing textile materials from a reducing bath containing sodium sulphide or sodium hydrosulphite. They are manufactured by sulphurizing para-hydroxyphenyl-amino carbazole in the presence of benzidine, which ultimately forms a part of the finished dyestuff.

For example, 8.72 kilograms of the indophenol obtained by the condensation of equimolecular proportions of nitrosophenol and carbazole is heated below a temperature of 100 deg. Cent. with a mixture containing 2 to 3 kilograms of crystalline sodium sulphide, 3 to 4 kilograms of sulphur and 2 liters of water, until the indiophenol is completely reduced. The product is then dried in a vacuum, powdered and heated with from one to two kilograms of benzidine at a temperature which varies between 150 and 200 deg. Cent. until the evolution of sulphurated hydrogen gas ceases. The product at this stage of the process is then partially purified by being washed with a hot dilute solution of sulphide of soda. The pure dyestuff is obtained by blowing air through a solution of the same in a boiling solution of sulphide of soda.

Practical Hints on the Production of Bright Colors on Textile Fabrics

Part I

Means for Producing Bright Colors—Shades Produced with Direct Colors—The Plant Employed—Method of Working—Defects in the Process—Simplification of the Process—Dyeing on the Continuous Soaper—Advantages of the Plant

By RAFFAELE SANSONE

DULL shades produced through the most different mixtures of dyestuffs of all classes are preferred to all others, owing to their greater fastness as a general rule and to the fact that the consuming public are often disinclined to buy fabrics dyed in bright or very bright shades. For such reasons the dyeing of bright and very bright shades has been limited more and more to a certain number of fancy articles, for use mostly at social affairs or for general wear in warm countries. From time to time fashion encourages brightly colored dresses, ribbons, scarfs, belts, etc.; but generally these modes are not followed by all, because of the belief of some that bright colors are too attractive.

There is no doubt, however, that the near future will bring a marked change in conditions, and from the dyer will be demanded the brightest and clearest shades, the public desiring, in addition, good fastness qualities, thus encouraging further study in the application of all coloring matters, with the purpose of making the goods treated through their means as bright and as clear as possible, without impairing in any way their fastness to washing or to light. A thorough study of the question can therefore prepare the dyers for improving the brilliance of the shades they produce, avoiding absolutely the production of glaring or unharmonious colors.

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Means for Producing Bright Colors

So far the dyer has considered as bright colors principally the basic coloring matters, the erythrosines, the eosines, the phloxines, etc., on cotton, and some acid colors and basic colors on wool and silk, considering all other colors as only fit for producing dull shades. With our present methods of dyeing, and with most of the products on the market to-day, this manner of considering colors is not altogether unsound. But in the future matters may change, and some of the colors at present considered dull can prove, if not capable of producing shades as bright as the basic colors or as some of the acid colors, at least of value for producing bright shades that are not very far from the first, and that can give satisfaction in many cases.

More or less bright colors can be produced on cotton goods with the following colors, or mixtures of colors, by using ordinary plants or specially constructed plants:

1. Certain direct coloring matters.
2. Mixtures of direct and basic colors.
3. Mixtures of sulphur and basic colors.
4. Basic colors on an alumina mordant.

5. Basic colors on a tannic acid mordant.
6. Basic colors by themselves.
7. Mixtures of vat and basic colors.
8. The acid colors.
9. Phloxine, eosine, erythrosine, etc.
10. The mineral colors, etc.

Bright Shades Produced With Direct Colors

The production of bright shades with direct coloring matters, owing to the extremely large range of shades, is less difficult than many may imagine, requiring principally a careful selection and their application on the cotton material under the most favorable conditions possible.

The best conditions under which cotton materials can be dyed for producing the brightest effects are as follows:

1. A pure white fabric having no bluing agent.
2. A pure white fabric that has been mercerized before bleaching.
3. A fabric as above, the face of which is arranged for receiving a high shine after dyeing and finishing.
4. A pure white fabric having no bluing agent and mercerized, the construction of which has been arranged for leaving it transparent, and ready for receiving at its back another but heavy mercerized white fabric for forming a double-faced cloth where the white ground shines through the front covering.

Besides the above precautions, others are of a certain importance for obtaining from direct coloring matters the brightest shades, and these are: The careful choice of the shading colors used; the choice of clean salt and sulphate of soda crystals; the choice of clean carbonate of soda crystals or phosphate of soda when employed in the dye baths; the use of suitable water; the avoidance of dyestuffs having diluting agents that can dull the shade or dirty the dye baths, etc.

For the above reasons, when the brightest direct coloring matters have been chosen for producing the desired effects or shade it is necessary to proof the nature of the mineral or organic diluting agents they contain. The purer colors should be given the preference over all others, and these ought to be used, if possible, without additions, using for the production of the deeper shades other chemicals than salt or sulphate of soda crystals. Moreover, in some cases it will be of value to proof if the colors selected dye better in the cold, from lukewarm or from boiling baths, if the brighter shades are obtained on the padding machine, on the jigger, or on other forms of machines already in employment or of possible construction.

Besides the above, the following items require special attention: The storage of the colors selected, to avoid their contact with others colors, with dust, or with dirt or other matter of any kind; the preparation of the dye baths; the way the drying is conducted; the way the cloth is finished; the way the cloth is packed, etc.

The Plant Employed

The plant employed for the production of bright shades with direct coloring matters can also play an important part in obtaining the best effects. Generally, in the most modernly directed works great attention is given to the cleansing operations conducted preparatory to dyeing in any color. A weak soda solution is often boiled in the vats of treatment, and any guiding or squeezing rollers are well scrubbed with a stiff brush; this treatment should be followed by a thorough rinsing with an abundant supply of clean running water. Besides these precautions, in some works a selection is made of the dyeing apparatus employed, using some machines only for yellows, some for browns, some for reds, etc.

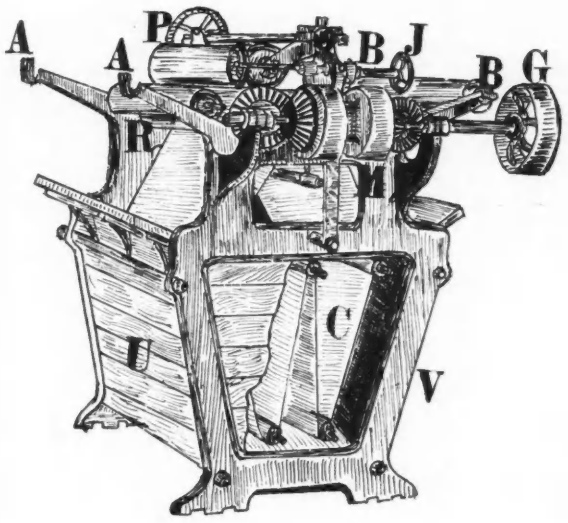
The above precautions are certainly of great value but do not always permit the best results, especially if the most suitable apparatus is not available. Thus, if the works are supplied with jigs where the material has to be dyed in very short baths, with some coloring matters it may be difficult to obtain the brightest shades, especially if phosphate of soda and soap are employed as the dyeing assistants. A form of jig which to the writer's knowledge has given very good results for the purpose is constructed on the principle shown in the first sketch.

Here is to be seen a strong wooden vat (U), the interior of which contains two lower and three higher guiding rollers, and the bottom portion of which has been left a certain width, allowing the treatment of the cloth (C) in an abundance of dye bath.

Vat U is enclosed in a strong, durable iron framing (V) that raises it to a certain height from the flooring of the works, and has at its upper portion a special mechanism (M) through which a wooden beam on the right, or a wooden beam on the left, can be turned for winding on the cloth, and causing this to run continuously through vat U, the turning of the one or of the other roller being initiated or stopped when the end of the cloth has been reached, and this pulls the roller from which it is being unwound.

The rolls of cotton cloth to be dyed are entered either on the right or on the left of the machine through the pairs of iron arms AA or BB. The position of the roll of cloth entered is indicated by R in the sketch. On the left of the machine and above the turning roller is a pressure roller (P), which can be raised or lowered on the turning roller by a small hand wheel (J). The mechanism driving the apparatus (M) is worked through a pulley (G).

In some plants, to enable the operator to observe how the cloth is being treated by the dyeing liquid one of the front sides of vat U is substituted by a large thick glass sheet strongly fastened to the vat. This innovation, when the plant is entrusted to able hands, causes no inconvenience; otherwise there is always the danger of the glass cracking or actually of its breaking.



For heating the dye baths a closed copper steam coil is employed, an end of which receives the steam required for the heating operations from a tap of the same material, while the other end is supplied with another tap to discharge all condensed water into a tube leading to the waste water main.

The Working of the Plant

For working the above plant and obtaining the brightest shades on cotton cloth, the dyer's first task is to observe if all portions of the plant are clean and completely free from dyestuff that can cause staining. After this he generally enters, as a supplementary precaution, cold running water in vat U, allowing this to circulate for some time, running out at its top, opening after this the lower portion of the vat to run off all contents, and closing the tap leading in the water.

He then enters a large piece of cloth or two small pieces, carefully rolled on a wooden beam and either in a dry or wet condition, by placing the small end shafts of the beam on the arms AA or BB and carrying the beginning of the cloth by hand downwards, causing it to pass over the five narrow guiding rollers in vat V and fixing it later to the turning beam at the other side of the plant. The jig is then placed in movement to run all the cloth on this beam, and when in this way the other end of the cloth has been reached the machine is stopped to fix this on the corresponding turning shaft or beam. When such operations have been accomplished, the wooden shaft used for the introduction of the cloth is taken off the sustaining arms, being used for rolling on other pieces.

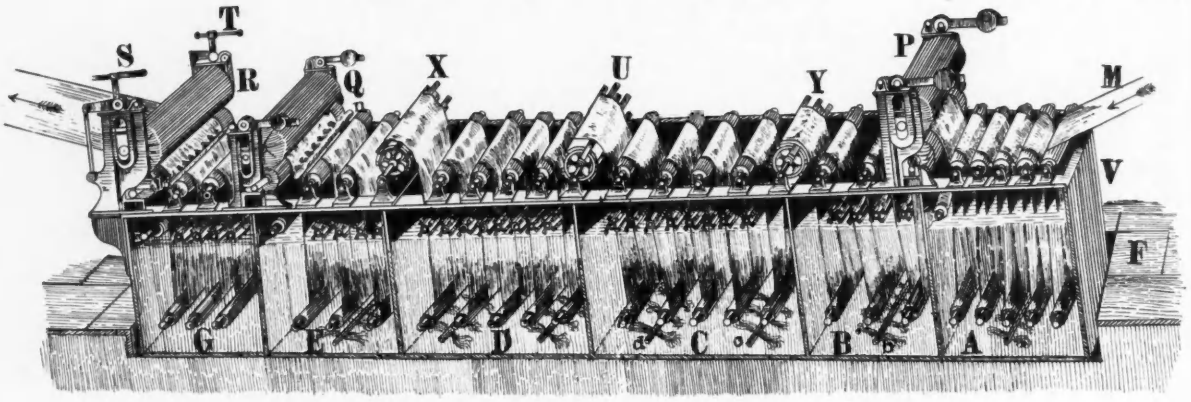
The dyer now rapidly prepares the bath of treatment by running into vat U a fixed quantity of clean cold water or of hot condensed water free from iron or other impurities that might color or stain the material, opening on steam in full to bring the bath to the boil and placing in movement the jig to carry the material backwards and forwards on the turning rollers. When in this way one of the ends of the piece has been reached, the plant is stopped and a soap solution is added in small doses at a time while continually stirring with a wooden stick. This separates a certain quantity of lime soap, due to the hardness of the water, that can be withdrawn through skimming; add more soap solutions and repeat the operation until no further insoluble soap appears. A fixed quantity of the same soap solution is then added, following this immediately after by a fixed quantity of phosphate of soda solution and by the strong coloring solution, which is prepared separately in a copper vessel or spoon, stirring continually with the wooden stick to cause a uniform mixture of the dye bath.

At this point the machine is placed in movement. The cloth comes thus to pass rapidly through the treating bath, taking up with it a portion of this that passes around the turning beam or roller, continuing the dyeing there. When in this way the whole length of the cloth has run through, its end pulls on the empty turning beam and inverts the driving mechanism, causing the cloth to change its running direction and to cover again the empty beam. By regulating the steam passing through the closed coil heating the dye bath, the bath is kept at the most convenient temperature, regulated in accordance with the coloring matters employed.

After having given the cotton cloth a certain number of turns, the dyer generally takes a small sample at one of its ends and, after having rinsed this in clean cold water under a tap, folds it between a little cotton calico and dries it on one of the steam tubes of the works, comparing the cutting with the pattern or sample to be matched.

Should the shade obtained be correct, he stops the machine when the cloth has reached one of its ends and runs off the dye bath, causing clean running water to enter vat U, after having closed the exit hole at its bottom so as to cause all running out to take place at the top of the vat; the machine is placed in movement again. In this way a thorough rinsing of the cloth follows, and after a time this can be taken from the jig and sent into the drying compartment.

With regard to the weight of the fabrics being treated, the percentage of dyestuff employed for the above operations can vary from ⅛ to 6 per cent, whereas the soap additions vary generally from 2 to 3 per



cent and the phosphate of soda additions from 2 to 3 per cent.

Defects in the Dyeing Process

The above dyeing process, although giving very satisfactory results in many works, especially as it permits the production of brighter shades than are possible through dyeing with salt additions, possesses, nevertheless, several defects. One of the principal of these is the large quantities of soap required when the water used for the dyeing is very hard. Besides this, if the upper portion of the dye bath is not properly skimmed to free it of the insoluble soap that collects there, this is taken up in different portions of the material, producing stains or patchy portions. For avoiding a similar inconvenience there are, however, at present on the market specially prepared oils that can be substituted advantageously for the soap, producing equally bright colors, if not brighter. Some care is necessary in the choice of these oils to avoid the use of dark-colored products or of products that might cause a certain coloring of the cloth.

A Simplification of the Dyeing Process

Another great inconvenience in the above dyeing process is the excessively high price of the phosphate of soda and the necessity of throwing away the dye baths after the treatment of each lot or change of goods; this represents nowadays quite a considerable expense, one that may not be compensated by what the client is disposed to pay for goods dyed in the works as a practice or treated for him. After a certain amount of experimentation conducted with different soaps or prepared oil (Turkey Red Oil), there is no doubt that the phosphate of soda used in the above instance could be omitted in many dyeing operations, obtaining equally bright shades, whereas the resulting waste dye baths can be used over and over again, first for the production of the lightest shades, where the color they contain is utilized in the matching mixtures, and then for the dyeing of the darker colors.

Dyeing on the Continuous Soaper

In some dye works producing, with direct coloring matters, large quantities of cotton cloth goods in a few bright shades, it is usual to employ an ordinary soaping range for the dyeing operations, conducting these entirely in baths containing only soap, and in some special cases a little carbonate of soda. In this way the material can be treated continuously all through, just as if an ordinary continuous dyeing machine were employed, and the plant can be employed for other purposes when no dyeing is required, such as ordinary soaping and rinsing operations. Besides this, the dyer has always before him the cloth being treated, and can easily control the shade produced.

The number of the open washing or soaping machines at present at disposal or at work is very large, and the construction of many of these varies very greatly.

Some of them are specially for a short soaping; others for a long soaping; others for a long or short soaping and following rinsing operations; others for the soaping operations and a preceding and following rinsing etc. In some plants it is possible to conduct the soaping operations in separate troughs, using several separate baths, and these are among those that have found the greatest favor for the dyeing of bright colors with substantive or direct coloring matters. A type of the same is shown in its most elementary principles in the second sketch.

It contains a long narrow vat (V) constructed of a suitable iron frame for resisting alkalies and rust, and fitted at a short depth in the flooring (F) of the dyehouse, in a cement-lined trough with a small space around it for collecting any portion of the bath that flows out and causing it to run off to the waste water main.

Vat V is divided into six compartments (A, B, C, D, E and G) with partitions of glass or of the above iron frame. The first and last two of such compartments (A, B and E, G) are of more or less the same size and of square shape, while the two central (C and D) are much larger and have a rectangular shape.

The first of such compartments (A) and the last (G) are used for the treatment of the cotton cloth (M) with clean cold running water, entered through an upper inlet tube and led out through a discharge tap at the bottom and an overflow tube at a certain height on one of the walls. Compartment A has also a copper steam-heating coil (a), which can serve for the warming of the bath contained therein.

It has below a deposit cistern, connected with a small centrifugal pump leading to compartment B, to the waste water main, or to wherever else may be required, and is supplied with five lower narrow wooden guiding rollers kept in the bath of treatment and five upper rollers turning on the outside in special bushes or bearings fixed on the upper rim of vat V and followed by a heavy pair of wooden squeezing rollers (P). This is kept under a slight elastic pressure by levers and weights, and between the same the cloth is squeezed after its treatment in compartment A, entering the following compartment (B), only containing about its own weight of water.

In this, when dyeing, a weak soap or prepared oil (Turkey Red Oil) bath containing the mixture of dyes is caused to enter slowly through an inlet tube and tap at the upper portion of the compartment, so that only a small quantity of the same makes its way out through an overflow tube into a second collection cistern below the plant. Compartment B is supplied with an open steam-heating disposition (b), and contains three guiding rollers, which remain in the bath of treatment, two of such rollers on the upper part of vat V.

The cloth, on making its way upward for the last time, is led onto a turning frame (Y) formed by wooden rods fixed onto two end hexagons, also of wood, or simply onto two circular copper disks. The material thus makes its way in a wet unpressed condition into the third compartment (C), only in a very lightly colored condition.

Here, while running upward and downward on five lower and four upper wooden or glass guiding rollers, it is submitted to a more vigorous treatment than in compartment B in a second soaping and dyeing bath, also entered through an upper inlet tube, and making its way out through an outlet tube into a third collection tank below the plant. This bath is heated through two open steam tubes (c and d), which also keep it in a continually mixed condition.

The cloth then makes its way into the fourth compartment (D), after passing on a second turning frame (U), the purpose of which is to submit the material to a continually repeated beating action, causing a thorough penetration in the innermost cells of the fiber and driving back a good portion of the soaping and dyeing liquid into the bath just below.

This compartment (D) contains five lower and five upper guiding rollers and a turning frame (X) which treat the material in the same way as in the preceding compartment (C). Here, also, the soaping and dyeing liquid is entered through an upper tube and is caused to run out slowly into a fourth lower collection cistern.

In this compartment the desired shade is nearly completely reached, the finishing touches being given later in the fifth compartment (E), where the last soaping and coloring bath is entered. This is of the same dimensions as compartment B, and contains an equal number of lower and upper guiding rollers; these are, however, followed by a pair of squeezing rollers (Q), kept under an elastic pressure through levers and weights.

It is also supplied with a water spraying tube before the pair of rollers, indicated in the sketch by n, and with water spraying tubes fixed in its lower portion through which the compartment can be employed either for dyeing, soaping or rinsing operations. This vat has below it a fifth collection cistern.

The rinsing compartment G has three lower and two upper wooden guiding rollers, followed by a pair of squeezing rollers. In order to give the goods a more thorough squeezing, these are supplied with two upper screws turned by hand levers (S and T). Before the nip of such rollers is placed a perforated iron tube for spraying cold or warm rinsing water on the fabric before its final exit from the machine. All compartments excepting the first (A) are supplied with special small beaters that render still more active the action of the baths of treatment.

All collection cisterns have a small centrifugal pump that can lead their contents to a solution-preparing apparatus, to the waste water main, to a soap recovery plant, directly to the inlet tube and tap of the next soaping and dyeing compartment, or, in fact, wherever else required.

The Advantages of the Plant

The advantages of the above plant for dyeing bright colors with direct coloring matters are several, and are well worth considering. Some of them are enumerated, as follows:

1. The dyer can use the plant for treating the boiled-out and bleached cotton goods with a single soap and dyeing bath, entering first in the last dyeing compartment (E) and passing from here little by little through the three compartments immediately preceding (D, C and B), then running into the collection cistern below.

2. The dyer can employ the plant for dyeing with two separate soaping and coloring baths, one of which is made to circulate through compartments C and B, and the other through compartments E and D.

3. The dyer can use the plant for dyeing the cotton goods with four separate soaping and dyeing baths, with two soaping and four dyeing baths, with three soaping and four dyeing baths, or with only one soaping and four dyeing baths, all containing the same or separate color mixtures.

4. Only the three compartments B, C and D can be

employed for the dyeing and soaping operations, and the three compartments A, E and G for the rinsing operations; or the four compartments B, C, D and E for the dyeing operations and the compartments A and G for the rinsing operations.

5. The first compartment of vat V can be employed for rinsing with cold water, for giving a soaping with a bath containing no dyestuff, or for giving a ground color, as may be more convenient for the shade to be produced.

6. All portions of the cloth passing through the plant can be observed by the operatives, and a poor shade observed during the passage in the first dyeing compartment can be corrected in many cases in time and while the material is passing through the compartments that follow.

7. The production is large, whereas the employment of labor, motive power, steam, space and time is small in comparison with jig dyeing and some other forms of dyeing.

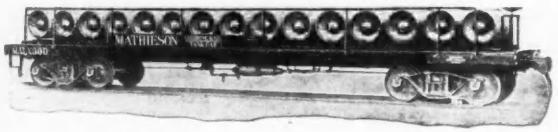
8. When dyeing with five separate baths the dye bath can be changed by entering at the end of the cloth being treated a waste cotton piece and first emptying vat or compartment A of all old bath, following this operation by a rinsing and by the new dyeing color just before the entrance of the beginning of the new lot of cotton goods to be dyed, repeating the same treatment in the following compartments when the end of the last piece being dyed has passed on their turning frame.

(To be continued)

THE MATHIESON CHLORINE TANK CAR IS APPROVED

The Mathieson multi-unit chlorine gas tank car, designed and operated by the Mathieson Alkali Works, Inc., is held entitled to the same freight rates and privileges as any tank car by decision of the Interstate Commerce Commission. The Commission completely upholds the contentions of the Mathieson Company and "safety first" principles embodies in this car design. The multi-unit car assures full compliance with the law by cleansing and accuracy in loading, and greatly increases the safety factor in handling and transportation by separating the units into fifteen containers carrying exactly 2,000 pounds each, as compared to a single unit chlorine tank car which carries fifteen tons in a single tank. The requirements of the law that containers carrying chlorine must be loaded on accurate scales, and approved plant practice of thorough cleansing and inspection of each container at the manufacturer's work is, with certainty, observed by this type of equipment. The reduction of the hazard is also an important factor. The certainty of the consumer that he is getting exactly 2,000 pounds of liquid chlorine in each container cannot be accomplished by any other type of equipment.

When the Mathieson company voluntarily went to the expense of designing and placing in service this multi-unit car over two years ago, the railroads held that it was not a tank car, and attempted to assess charges far in excess of those applying on the Class V tank car, ignoring the advantages to themselves, their employees, and the public at large from a "safety first" standpoint. In the interest of both the producer and the consumer, therefore, the Mathieson Company appealed to the Interstate Commerce Commission that this discrimination be removed, that the industry might be able, economically, to use this equipment. While this case was pending, the Mathieson Company assumed the excess freight charges on every movement, in many cases three times the charges on a single-unit tank car.



It is believed that this voluntary action is a far-sighted step in the interests of the general public safety, of the producer of chlorine, of the consumer, and of the carriers. By this favorable decision, the Mathieson Alkali Works has been upheld by the Interstate Commerce Commission, which body is responsible for the public safety in the transportation of any hazardous article. The Mathieson Company has performed an important beneficial service to the entire electrolytic alkali industry. All large chlorine consumers such as the pulp and paper industry will materially benefit in their ability to secure, in a safe, economical and convenient manner, one of their important raw materials.

The Synthetic Organic Chemical Manufacturers' Association has submitted to the chairman of the New Jersey Commission appointed to draft an amendment to the Workman's Compensation Law, a suggestion for such an amendment covering certain diseases peculiar to those employed in the chemical industry.

This proposed amendment, the purpose of which is to make disabilities resulting from certain occupational diseases compensative under the Workman's Compensation Act, outlines a system whereby workmen who contract lead, mercury, arsenic, phosphorous, benzol or other chemical poisoning, will be fully protected by the act.

By thus co-operating in the protection of employees in the chemical and dye industries, the Association gives ample evidence of its fraternal spirit in attending to something which, while apparently a mere detail of business, nevertheless bears directly on the life and health of countless workers.

The Arghan Fiber

The Fiber in the Malay Federated States—Tests Made —Testing the Cells—Chemical Tests

By Max Becke

(An address delivered at the Seventh Congress of Dye Chemists in Salzburg)

Translated by Ismar Ginsberg, B.Sc., Chem. Eng.

CERTAIN information has appeared in technical and other literature on the arghan fiber. The author, interested in finding out exact details regarding this matter, succeeded in obtaining a sample of the fiber, as well as of the yarn made from it.

Arghan fiber is not a new material, for in 1860 the fiber was used for textile purposes and was derived from South and Central America. At that time the properties of the fiber were determined and it was concluded that it closely resembled linen. However, in spite of its apparent advantageous properties, it never became important in the textile industry, probably because of the difficulty of obtaining regular and large supplies of it.

According to the botanical properties of the fiber, the Pita plant, as it is called in Spanish, which is in reality the Spanish word for fiber, belongs to the Bromeliaceae family and is found growing wild in the tropical regions of America between the parallels 15 deg. north and 15 deg. south of the equator. The plant, which is also known by the name of "wild pineapples," has fleshy or pulp pointed leaves 6 to 9 feet long and 3 to 4 inches wide at the lower end. These leaves are from one-quarter to three-eighths of an inch thick in the middle, growing thinner toward the point. Because of spines on both sides, the working up of the leaves into fiber is a difficult matter. The bundles of fibers run through the entire length of the leaves. These bundles can be divided into very fine fibers, ten thousand of which are required to make 1 inch in thickness.

The natives obtain the fibers by working the leaves on a flat board with a sort of scraping tool of hard wood or metal with rounded edges; by rubbing this tool over the leaf the fibers are loosened. They are then cleansed and dried. It is estimated that the supply of the fiber available each year amounts to one-half million tons.

The Fiber in the Malay Federated States

The South American supply of this fiber was altogether too uncertain and too small to make it of any consequence, and hence certain English interests undertook to grow the fiber much in the same manner as rubber trees are cultivated. In other words, the wild plant was transplanted in the Malay States and also in Ceylon and India, and plantations were established similar to rubber plantations. The plant that yields the arghan fiber is perennial. The leaves of the plant can be gathered after the third year of growth at any time during the year and employed in the manufacture of the fiber.

At present there are plantations of this plant in various part of the Malay States, particularly Perak, and the indications are that there will be eventually a large amount of this fiber available for textile purposes. It is said that a ton of arghan fiber costs only half as much as a ton of cotton.

Tests Made with the Fiber

The fiber was tested to determine its properties; only a small sample was available. It was found almost free of impurities or chaff. The length of the fibers varied from 60 centimeters to 1 meter, and they were regular in thickness. About ten bundles of fibers with an average length of 60 centimeters weighed between 97 and 98 milligrams. Bundles averaging 50 centimeters in length weighed about 60 milligrams.

Strength tests were made with twenty different samples of fibers. The tension span was 100 millimeters and the average tearing length was found to be 21.6 kilometers. When the fibers were twisted together into the form of a yarn their strength was correspondingly increased from 35.2 to 42.6 kilometers. The bundles of fibers in the raw condition show a very marked degree of strength, about equal to that of linen or cotton.

Testing the Cells of the Individual Fibers

The cells of the individual fibers are tubular in shape, running out at both ends in the form of a tape with a very fine point. A structure characteristic of a fiber suitable for spinning purposes is not evident. At the pointed ends the thickness of the fiber is about 0.003 millimeter, while in the thicker part of the fiber it is increased to 0.005 to 0.006 millimeter. The length of the individual cells is about 10 millimeters or less. The isolated single cells show the characteristic reaction of pure cellulose and is similar to the crude cotton fiber in its hydrolyzability.

Apparently the value of the arghan fiber lies in its use for spun or woven goods which are produced from bundles of fibers. There is no advantage to be gained in using the individual fibers themselves, for they are too short to be employed in spinning textiles.

Chemical Tests

A test was also made of this fiber by boiling it in water and then testing the water for acidity. From this standpoint the arghan fiber resembles cotton, for the water in which it has been boiled gives a neutral reaction in contradistinction with retted flax, which gives a digestion liquor of acid reaction. Further-

more, the digestion liquor was tested with Fehling solution and it was found therefrom that the arghan fiber yielded no more reducible substances than crude cotton but less than flax. From the standpoint of wetability, the arghan fiber is superior to the cotton fiber. In a salt solution the arghan fiber dyes better with Dianil Pure Blue than linen yarn or flax, and does not appear to be any less dye-absorbent than cotton.

[*The address of Max Becke has been abridged to a considerable extent. The information it contains is, however, very interesting, for it seems that a serious attempt has been made to introduce a new fiber into the textile industry. The properties of this fiber appear to be advantageous, and it compares favorably with flax, hemp and manila hemp, on the one hand, and cotton on the other. Furthermore, its cost is considerably less than any of these fibers.—Trans.*]

Steam in Scouring

Test of Heat Consumption in Wool Scouring and Drying

Practically nothing has been published on the steam consumption in wool scouring and drying, and the following figures from tests made by the writer will be of interest. The data given were taken from a three-bowl wool scouring machine.

The water for scouring is supplied to the bowls at a temperature of 110 to 120 deg. Fahr. The scouring solution is mixed in a tank with a capacity of 500 gallons. This tank is equipped with injectors and the solution is taken out in pailfuls and injected over to the machine bowls. The injectors are placed close to the top and over the tank. The operator is able to measure the quantity of solution required by using a standard three-gallon pail. The hardness of water varies when taken from rivers so that the quantity of solution is not always the same.

The bowls were as follows:

No. 1—21 feet by 36 inches, 3 hopper bottom, capacity 800 gallons:

No. 2—16 feet by 36 inches, 2 hopper bottom, capacity 600 gallons.

No. 3—16 feet by 36 inches, 2 hopper bottom, capacity 600 gallons.

To fill the bowls at starting time requires 2,000 gallons. All bowls are equipped with perforated steam pipes and these are used when the hot water system is out of order, or whenever hot water is not available.

The dryer is of the three-apron type, having two banks of coils, with a total radiating surface of 1,100 square feet, the air being circulated by means of fans set inside the dryer.

Steam Use in Drying

The wool leaving the wash bowl contained on an average of 30 to 40 per cent. of moisture over the dry weight of the wool. The consumption of steam was greater in the first hour owing to the coils and dryer being cool; the readings being as follows:

7 A. M. to 8 A. M.....640 pounds
1 P. M. to 2 P. M.....396 pounds
3 P. M. to 4 P. M.....392 pounds

The condensate was trapped and weighed on a platform scale. The average hourly consumption of steam in the dryer was 420 pounds, giving a rate of 0.38 pounds per square foot of radiation, the pressure carried in the coils being from 55 to 60 pounds gauge.

The grease wool put through the dryer in 9½ hours was 7,200 pounds, and two different lots were used in the test, as follows:

Grease wool, 4,200 pounds; dry scoured, 2,814 pounds; loss, 33 per cent. Grease wool, 3,000 pounds; dry scoured, 1,860 pounds; loss, 38 per cent.

The total wool delivered to the cardroom was 4,674 pounds. The steam used in the dryer during the 9½ hours run was 4,000 pounds; or 1.168 pounds of wool were dried per pound of steam. The steam required to boil the liquor in the soap tank will vary according to the temperature of the water. With water at 50 deg. Fahr. the steam required would be between 500 and 600 pounds. Textile World.

More Statistics: The Dyeing and Finishing Industry

In the Bureau of Census bulletin "Textiles: 1919 Census of Manufacture" the section devoted to the dyeing and finishing of textiles contains interesting comparative figures for that industry. To quote from this chapter of the bulletin:

"The statistics presented in this report are for establishments engaged primarily in dyeing and finishing textiles. The report covers such operations as the bleaching and dyeing of stock, yarn and cloth without regard to the kind of fiber, whether cotton, wool, silk, etc.; also the mercerizing and printing or other converting of yarn and cloth, as well as the beaming, the winding of yarns and the spooling of thread (except the winding and warping of silk).

"The majority of establishments included in this industry specialize in this kind of work and instead of owning the materials, except for chemicals and dyestuffs, they are furnished by others and the work is performed on a contract or commission basis, so that the value of products for the industry represents the amount which is charged for performing the dyeing and finished processes. In some instances, however, the goods dyed or finished are owned by the establishments which perform these final operations, and under such circumstances the cost of the fabric is

included in the cost of materials, while the value of the finished cloth is included in the value of products.

"A considerable number of cotton, silk and woolen mills carry on in the same establishments one or more of these subordinate processes in connection with the manufacture of textiles. Where practicable, separate returns were secured for the dyeing and finishing departments of such mills, in which case the departments were treated as separate establishments in compiling statistics for this report, and the value of products represented the cost of operating this branch of the plant."

In the statistics given below we have taken account of the figures for only the five leading textile States—Massachusetts, Pennsylvania, New Jersey, New York and Rhode Island.

As in the textile industry as a whole, Pennsylvania had, in 1919, the largest number of dyeing and finishing establishments—163. The value of the products treated by these factories amounted to over $42,000,000. As a significant contrast, Massachusetts, with but 62 establishments, handled products with a value exceeding $75,000,000. In the value of products New Jersey ranked first, probably because of her largest industry—silk manufacture—which also happens to be the largest textile industry carried on in the five leading States. Massachusetts, with the smallest number of establishments when compared to the other four States, ranked second; New York, with 133 establishments, ranked third, with a valuation figure slightly more than that given above for Pennsylvania. Rhode Island, with only 67 such factories, handled textiles valued at $42,258,000.

In 1919 in the entire United States there were 628 dyeing and finishing establishments. That 557 of these should be located in the five States listed above is surprising. Also, that of the $323,968,000 representing the value of the products, nearly $300,000,000 worth traveled through the dyeing machines of those same five States, gives some definite idea of the extent of the industry in this section of the country.

In giving the above figures for the value of the products, the amount *added* to that value by the manufacture presents a total worthy some consideration. For instance, as stated, the total value of the products for the entire United States was $323,968,000, but when the value resulting from manufacture is added the figure is increased to over $473,000,000. As a further example, New Jersey's valuation figure was, in round numbers, $79,000,000, while the value added to that by manufacture was over $35,000,000, or nearly half.

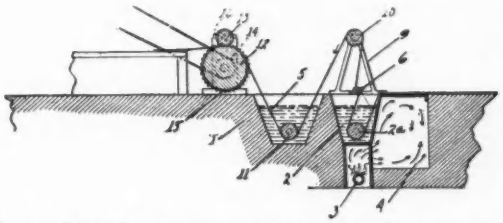
E. I. du Pont de Nemours & Co. are making arrangements to retire $10,000,000 par value 7½ ten-year gold bonds on May 1. Retirement of these bonds will reduce the bonded indebtedness of the parent company to $18,000,000, against an original amount of $35,000,000 outstanding on May 1, 1921.

RECENT PATENTS

Felt-Treating Machine

(1,471,980)

Albert J. Ryan, Cincinnati, Ohio.



A machine for impregnating a continuous strip of fabric with hardening compound, which comprises means for drawing a strip of fabric through the machine, a vat for molten hardener compound, and a device to receive the fabric located so as to drain into the vat, said device formed of a tubular body, having slots therein set in a plane transverse the direction of withdrawal of the fabric, whereby the compound is accumulated within the body and is scraped from the fabric, and worked into the fabric while same passes through said two slots.

Blue Sulphur Dye

(1,471,854)

Walter A. Manss, Wilmington, Del., assignor to E. I. du Pont de Nemours & Co., Wilmington, Del., a corporation of Delaware.

The process of rendering suitable for machine dyeing the product obtainable by thionating, with aqueous or alcoholic polysulphide, phenyl-p-amino-p-oxy-diphenylamine, and by precipitating the dye from the resulting mixture by means of acid or air, which comprises mixing one part of said product and from about 1 to 2 parts of water with about 8 parts of sulphuric acid of from 90 to 95 per cent strength, while allowing the temperature of the mixture to rise to between 75 and 90 deg. Cent., until a homogeneous mixture is produced, and then treating the resulting mixture with water to precipitate the dye.

Manufacture of Formaldehyde Condensation Products Products of Phenols

(1,472,353)

James Gibbon Byrom, Heaton Chapel, England, assignor to Richard Attwater, Lancaster, England.

In the preparation of phenol formaldehyde condensation products the use of sodium thiosulphate (commercially known as sodium hyposulphpite) as catalytic or condensing agent.

Diazo Coloring Matter

(1,472,333)

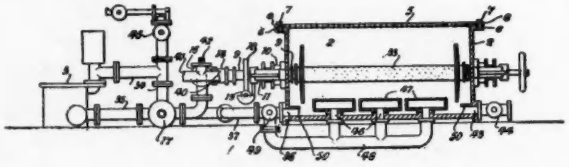
A. Willard Joyce, Newark, N. J., assignor to The Chemical Foundation, Inc., New York, N. Y., a corporation of Delaware.

The new diazo coloring matters obtained by combining one molecule of diamino diphenyl ketone with two molecules of a naphthylamine derivative, said coloring matters in a dry state being reddish powders which dissolve readily in concentrated sulphuric acid and in water, precipitate from water solutions upon the addition of hydrochloric acid, and dye cotton, wool, silk and artificial silk red shades, fast to light, acids, alkalis and washing.

Rotary Perforated-Beam Apparatus for Dyeing and Otherwise Treating Yarn With Fluids

(1,471,658)

Robert Smith Heap, Ightenhill, Burnley, England.

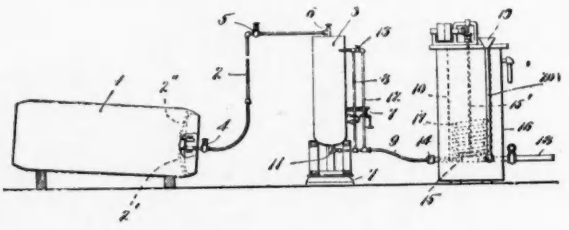


An apparatus for treating yarn with fluids, a vat, a plurality of nozzles opening into the vat, a perforated hollow box for each nozzle through which the liquid passes and which are adapted to support yarn in the cop, cheese or hank, and a common conduit for supplying a fluid to all of said nozzles.

Apparatus for Making Hydrosulphites

(1,472,828)

Frederic Augustus Eustis, Milton, Mass.

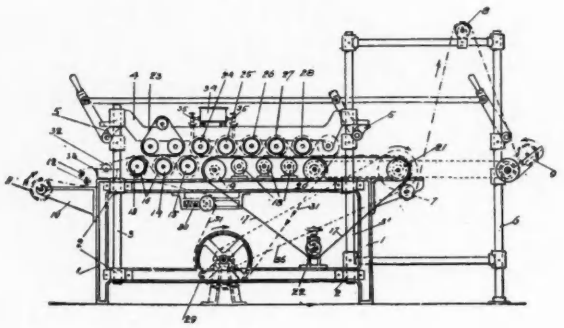


Apparatus for making hydrosulphites comprising a supply tank for holding a measured quantity of liquid sulphur dioxide, a mixing tank, and a valve controlled connection between the supply tank and the mixing tank adapted to control the rate of flow therethrough without permitting the sudden expansion of the sulphur dioxide in said connection.

Process and Device for Finishing Textile Fabrics and the Like

(1,471,551)

Paul Edlich, Delawanna, N. J.



A machine for imparting a natural appearing finish to a textile weave or similar material, the combination of a series of rollers adapted to alternately rotate in reverse directions and bear against the reverse surface of the material, a traveling apron disposed opposite said rollers and yieldably supporting the material at its future right surface, another series of rollers, having a greater number of rollers than the first series, adapted to alternately rotate in reverse directions and to bear against the right side of the material, a traveling adjustable apron disposed opposite said second series of rollers for yieldably supporting the material at its finished reverse side, means for adjusting the tension of said last apron, and means for supplying a chemical fabric treating agent to the respective surfaces of the material prior to being mechanically treated by said series of rollers.

FALLS DYEING COMPANY PLANT BOUGHT

It is reported from Paterson, N. J., that the Clifton Piece Dye Works, which was incorporated last October, has purchased the plant and property of the Falls Silk Dyeing Company, on Burhans Avenue, Oxford and Laurel Streets, Paterson, consisting of a factory building of 25,000 square feet of floor space and twenty-five city lots, for $100,000. The new owners will make extensive alterations, after which they will move from Mill Street, where they have located temporarily. The property was owned by John K. Greenwood, of Paterson, who, with Joseph Carroll, constituted the Falls Dyeing Company. Mr. Greenwood is retiring from the business, which will be continued by Mr. Carroll in a plant he has taken on East Twenty-second Street.

L. B. Fortner Company, Boston and Philadelphia, announces that Charles C. Young has become associated with them. Mr. Young was formerly manager of the Bayer Company at Boston and the National Aniline & Chemical Company at Providence.

THE 1923 DYE CENSUS

For the past four or five years The REPORTER has not been backward in praising the diligent efforts of the United States Census Bureau—efforts clearly evident in the efficient manner in which the annual Dye Census is prepared. Our contemporary, Drug & Chemical Markets, comments on these valuable statistics thus:

"This series of annual census reports denotes the progress of the dye and chemical industries since 1917, the year covered in the Commission's first report. These reports, particularly that for 1922, elicited much favorable comment from the trade and have been referred to by English and French chemists in correspondence with the Tariff Commission as the most complete and highly technical censuses published."

The 1923 Census, it is expected, will be distributed about July 1, depending largely on the co-operation of the dye manufacturers. Schedule forms have been sent to them and by a simple arrangement with the Tariff Commission it will be necessary to submit but one set of figures. In this way much inefficient duplication is avoided.

The same useful features contained in the last census report will be included in that for 1923: Imports and Exports, Production, Price Fluctuations, International Dye Trade, etc., not omitting, of course, the interesting introductory of so practical a value to everyone in the industry. New features will be added, of which announcement will be published shortly.

The C. J. Tagliabue Manufacturing Company has issued a little sixteen-page booklet, "The TAG Line," describing the numerous types of industrial, recording and dial-indicating thermometers, automatic controllers, vacuum gauges, oil-testing instruments, hydrometers and other similar products manufactured in its Brooklyn plant. The booklet is fully illustrated with clear photographs and diagrams of each instrument, and footnotes give the numbers of the catalogues and bulletins in which complete information about any of the products may be obtained. The use of each thermometer and controller and its special mechanical features and advantages are explained, and in some cases necessary specifications are given. As the booklet is a handy index to all other bulletins issued by the company, it doubtless will be filed among the purchasing agent's collection of reference catalogues.

FRANKLIN PROCESS CO. STOCKHOLDERS MEET

At the annual meeting of the stockholders of the Franklin Process Company in the offices of the Providence plant, Eugene S. Graves, president of the company, stated that in spite of the subnormal conditions that had prevailed in that portion of the textile industry that the company served, the total pounds of yarn dyed by the three plants at Providence, Philadelphia and Greenville, S. C., respectively, had shown an increase of 25 per cent over the poundage dyed in 1922.

Mr. Graves further stated that the sale of Franklin Dyeing Machines during 1923 had been good and that still better business in this department of the company was looked for in 1924. In fact, machinery orders now on the books will carry the machinery manufacturing well into next June. The bulk of this business is a large export order for India, but prospects for a good business are also favorable.

The Indian export order was received through the company's foreign selling agents, the Universal Winding Company, which, incidentally, also received orders for complete Universal Winding Machine equipment to be used in conjunction with the Franklin Dyeing machines.

At the meeting attention was also called to the purchase of an 8,000-spindle cotton yarn mill located near Spartanburg, which the company has been operating since November 1st. This mill is delivering yarn to the three Franklin Process dyeing plants, wound on Franklin tubes all ready for dyeing.

Given a normal market, Mr. Graves stated, the company should enjoy prosperity during 1924, as the number of customers served is increasing and has materially increased during the last year.

The following directors were elected for the ensuing year: E. S. Graves, E. P. Jastram, L. W. Jones, W. A. Traver, R. A. Leeson, J. C. Hartwell, A. G. Dana.

Following the election of the directors, they held a meeting and elected the following as officers: President and General Manager, E. S. Graves; Vice-President, E. P. Jastram; Treasurer, L. W. Jones; General Plant Manager, W. A. Traver; Secretary and Assistant Treasurer, C. E. Salb.

BRILLIANT SULPHUR SKY BLUE CFG

The Dunker & Perkins Company announces another addition to its well-known line of sulphur colors—Brilliant Sulphur Sky Blue CFG—manufactured by the Beaver Chemical Corporation, Damascus, Va.

This product produces a very bright, clear shade of sky blue (green shade), similar to indigo. It is extremely soluble and has exceptional fastness to chlorine, washing and light. The company is prepared to fill orders immediately from stock now carried in Boston.

THE CHEMICAL INDUSTRY VALUES ADVERTISING

The place that advertising occupies in modern merchandising plans is well exemplified in the chemical industry. A few years ago the potential possibilities of this selling force were not fully recognized by the industry. But as competition grew keener, as sales managers looked around for additional selling tools, they observed other industries smoothing the way for salesmen through the use of advertising.

They saw that advertising intelligently employed performed a definite and valuable function in decreasing sales resistance. As a result the chemical industry took an increased interest in advertising and, very logically, sought to obtain the ultimate benefit from its use.

They called in the advertising agencies and intrusted to the men who make a continual study of advertising the task of preparing effective publicity.

The great majority of chemical firms now employ agencies. Their ranks are growing, the latest addition being the Heller & Merz Company, New York, manufacturers of aniline colors, which has placed its account with the Hazard Advertising Corporation of New York.

This agency recently has also been appointed to handle the advertising of the Willcox & Gibbs Sewing Machine Company, manufacturers of industrial and domestic sewing machines; the Torrington Company, Torrington, Conn., manufacturers of latch needles for the textile industry; Lestershire Spool & Manufacturing Company, Johnson City, N. Y., makers of vulcanized fiber spools and bobbins; Morris & Co., Inc., Groveville, N. J., manufacturers of canvas baskets, hampers and trucks, and the International Salt Company, of Scranton, Pa.

BROOKLYN INSTITUTION ANNOUNCES COURSE IN DYE TESTING

Registration is now being held for a laboratory course in textile chemistry and dyeing to be given two evenings per week at the Brooklyn Technical Evening School, Seventh Avenue and Fifth Street, Brooklyn, N. Y.

The course will comprise the methods of dye testing, application of all classes of dyes to all fibers, fastness tests, color matching, properties of textiles, etc.

The instructor is one of the dye experts of the U. S. Government, passing on the competitiveness of imported dyestuffs.

The Lowell Bleachery South, which completed its plant at Griffin, Ga., last year, is reported planning the installation of additional bleaching and finishing machinery for treating textile fabrics other than the Turkish towels, terry cloth and crashes which it now handles for the Kincaid Manufacturing Company.

Copies of the American Dyestuff Reporter of December 3, 1923, are needed

If you have spare copies communicate with us

Howes Publishing Co.
Woolworth Bldg. New York

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3,790	pounds	Chrome Fast Blue 2R (Swiss)
1,390	"	Aminogene Blue RN (Swiss)
836	"	Curcuphenine (British)
11,000	"	Sulphur Green
20,000	"	Sulphur Brown
17,000	"	Sulphur Cutch

Make offer. Samples upon application. Address Box 235, American Dyestuff Reporter.

Opportunity for young man, having practical experience in the uses and applications of textile and leather softeners, sizes, and finishes, and able to introduce these, and satisfactorily demonstrate in the mill. One with sales ability and known to consumers, and having knowledge of the manufacture of these products will be given the preference. Reply fully, stating experience in detail, salary desired, reference, etc. Address Box 243, American Dyestuff Reporter.

Large manufacturing and selling corporation wants well connected Southern agent or representative with headquarters in Atlanta or Chattanooga, to sell on commission a line of heavy chemicals, dyestuffs, sizing and finishing materials, soluble oils, etc. Only responsible and well connected applicants considered. Give complete data in first letter. Address Box 244, American Dyestuff Reporter.

Textile Chemist desires position in Philadelphia. Graduate of Philadelphia Textile School. Experienced generally. Address Box 245, American Dyestuff Reporter.

Dyer, English training, seeks new connection. Extensive experience on worsted and woolen piece goods, raw stock and yarn; also union goods, cotton and artificial silk. Capable of assuming entire charge of dyeing operations. Address Box 246, American Dyestuff Reporter.

NAPHTHOL GREEN

We are the largest manufacturers in America of NAPHTHOL GREEN—universally admitted to be the fastest to light Acid Green—and best for money value

ETHONIC FAST NAVY BLUE BL

An acid navy blue recommended for carbonized stock. Excellent for piece goods. Very fast to light.

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A new sulphur color of perfect solubility on the blue tone. Produces maroon shades of good brilliancy and fastness.

AMIDINE RED F

A fast direct cotton red suitable for unions, half silk work. Produces fast shades of red, which can be aftertreated.

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Index to Advertisers Appearing in This Issue

Althouse Chemical Co..... IX
American Dyewood Co..... IX
Arkansas Co. VIII
Atlantic Dyestuff Co..... VI
Atlas Electric Devices Co..... VI
Atteaux, F. E., & Co..... VII

Bosson & Lane..... XVI

Campbell, John, & Co..... XV
Croton Color & Chemical Co..... XV

Dunker & Perkins Co.... IX
Du Pont de Nemours, E. I., & Co..... III
Dye Products & Chemical Co..... IV
Dyer, Calico Printer, Bleacher & Finisher..... IV

Fletcher Works IX
Foster, Edward C..... X

Geigy Co., Inc.....Front Cover
Grasselli Chemical Co..... V

Innis, Speiden & Co..... XVI
International Salt Co..... XIII

Klipstein, A., & Co.....Second Cover
Knitting Arts Exhibition..... V

Malt Diastase Co..... VIII
Metz, H. A., & Co..... XII

National Aniline & Chemical Co..... XIV
New Brunswick Chemical Co..... XI
Newport Chemical Works.....Fourth Cover

Roessler & Hasslacher..... XIII

Tagliabue Mfg. Co..... X
Taylor Instrument Cos..... IX

United Chemical Products Co..... VII
United States Color & Chemical Co..... IV

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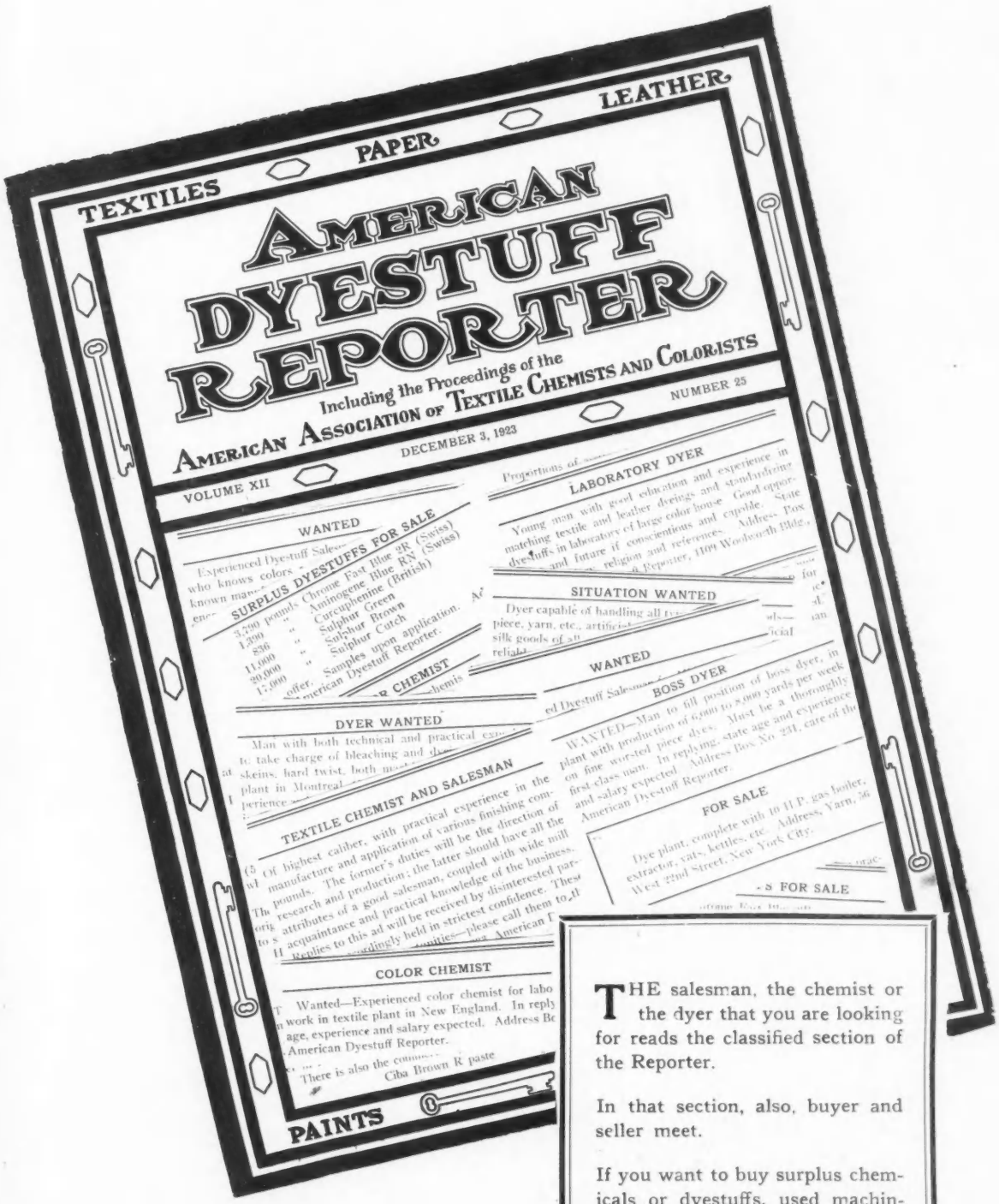

THE salesman, the chemist or the dyer that you are looking for reads the classified section of the Reporter.

In that section, also, buyer and seller meet.

If you want to buy surplus chemicals or dyestuffs, used machinery, laboratory apparatus, there you will find your opportunity.

If you desire to SELL, there lies your market.

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Newport Service

Modern American Dyestuff firms are much more than mere factories. They are veritable institutes of textile technology where the problems of better decoration and clothing of civilization are constantly and intensively studied and researched, culminating in results of great importance to mankind and therefore vital to those engaged in textile production. When Newport advertises co-operation it means something.

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Passaic, New Jersey

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